

GAP

Release 4.4.7
10 March 2006

Index

The GAP Group

<http://www.gap-system.org>

Full Index

This index covers the five main books of the GAP manual, pages are given with respect to each manual: **Ref**, **Tut**, **Prg**, **New**, and **Ext**. A page number in *italics* refers to a whole section which is devoted to the indexed subject. Keywords are sorted with case and spaces ignored, e.g., “**PermutationCharacter**” comes before “permutation group”.

- (Near-)Additive Magma Categories, *R* 552
 - (Near-)Additive Magma Generation, *R* 553
 - +, R 48
 - , R 48
 - A, R 30
 - B, R 30
 - C, R 31
 - D, R 30
 - K, R 29
 - L, R 29
 - M, R 30
 - N, R 30
 - O, R 30
 - P, R 31
 - on Macintosh, R 31
 - R, R 29
 - T, R 31
 - U, R 31
 - W, R 31
 - on Macintosh, R 32
 - X, R 31
 - Y, R 31
 - a, R 30
 - on Macintosh, R 32
 - b, R 27
 - e, R 27
 - on Macintosh, R 32
 - f, R 27
 - on Macintosh, R 32
 - g, R 28
 - g -g, R 28
 - h, R 27
 - i, R 31
 - l, R 29
 - m, R 28
 - n, R 28
 - on Macintosh, R 32
- o, R 28
 - on Macintosh, R 32
 - p, R 31
 - q, R 27
 - r, R 29
 - x, R 28
 - y, R 28
 - z, R 31
 - on Macintosh, R 31
 - ., E 16
 - .gaprc, R 33
 - /, R 48
 - for character tables, R 728
 - %, E 24
 - %display, E 25
 - %enddisplay, E 25
 - *, R 48
 - for character tables, R 728
 - \', R 247
 - \., E 16
 - \>, E 16
 - \Appendices, E 11
 - \BeginningOfBook, E 11
 - \Bibliography, E 13
 - \C, E 20
 - \Chapter, E 15
 - \Chapters, E 13
 - \Colophon, E 11
 - \Day, E 14
 - \Declaration, E 27
 - \EndOfBook, E 13
 - \F, E 20
 - \FileHeader, E 27
 - \FrontMatter, E 11
 - \Index, E 11
 - \Mailto, E 16
 - \Month, E 14

\N, E 20
\OneColumnTableOfContents, E 11
\Package, E 11
\PseudoInput, E 14
\Q, E 20
\R, E 20
\Section, E 15
\TableOfContents, E 12
>TitlePage, E 12
\Today, E 14
\URL, E 16
\UseGapDocReferences, E 12
\UseReferences, E 11
\XYZ, R 247
\Year, E 14
\Z, E 20
\", R 247
\\, R 247
\accent127, E 16
\atindex, E 16
\b, R 247
\beginexample, E 22
indicating unstable output, E 23
\beginitems, E 20
\beginlist, E 21
\beginntt, E 22
\c, R 247
\calR, E 20
\endexample, E 22
\enditems, E 20
\endlist, E 21
\endtt, E 22
\fmark, E 16
\in, operation for testing membership, R 272
\index, E 16
\indextt, E 16
\item, E 21
\itemitem, E 21
\kernttindent, E 16
\lq, E 16
\matrix, E 23
\n, R 247
\nolabel, use in index and label suppression, E 15
\null, use in index suppression, E 15
\package, E 11
\pif, E 16
\r, R 247
\rq, E 16

\^, R 48
for class functions, R 766
1-Cohomology, *R* 375
2-Cohomology and Extensions, *R* 454

A

A, Attribute mark-up, E 16
AbelianGroup, R 507
AbelianInvariants, for character tables, R 730
for groups, R 364
Abelian Invariants for Subgroups, *R* 474
AbelianInvariantsMultiplier, R 378
AbelianInvariantsNormalClosureFpGroup, R 474
AbelianInvariantsNormalClosureFpGroupRrs,
R 474
AbelianInvariantsOfList, R 239
AbelianInvariantsSubgroupFpGroup, R 474
AbelianInvariantsSubgroupFpGroupMtc, R 474
AbelianInvariantsSubgroupFpGroupRrs, R 474
AbelianNumberField, R 586
abelian number field, R 588
abelian number fields, canonicalbasis, R 589
abelian number fields, Galois group, R 591
AbelianSubfactorAction, R 400
About Functions, *T* 25
About Group Actions, *R* 392
AbsInt, R 126
AbsoluteIrreducibleModules, R 747
AbsoluteValue, R 156
absolute value of an integer, R 126
AbsolutIrreducibleModules, R 747
abstract word, R 321
AbstractWordTietzeWord, R 483
accessing, list elements, R 171
record elements, R 258
Accessing a Module, *R* 692
Accessing Record Elements, *R* 258
Accessing Subgroups via Tables of Marks, *R* 713
Accessing Weak Pointer Objects as Lists, *E* 53
Acknowledgements, *T* 12
AClosestVectorCombinationsMatFFEVecFFE,
R 215
AClosestVectorCombinationsMatFFEVec-
FFECoords, R 215
ActingAlgebra, R 629
ActingDomain, R 404
Acting OnRight and OnLeft, *R* 430
Action, R 399

action, by conjugation, R 393
 on blocks, R 393
 on sets, R 393
ActionHomomorphism, R 398
 Action of a group on itself, *R 400*
 Action on Subfactors Defined by a Pcs, *R 445*
 actions, R 393
 Actions of Groups, *T 47*
 Actions of Matrix Groups, *R 426*
ActorOfExternalSet, R 406
Add, R 174
 add, an element to a set, R 193
AddCoeffs, R 213
AddGenerator, R 485
AddGenerators, R 341
AddGeneratorsExtendSchreierTree, R 422
AddHashEntry, N 10
 Adding a new Attribute, *P 37*
 Adding a new Operation, *P 36*
 Adding a new Representation, *P 38*
 Adding new Concepts, *P 39*
 addition, R 48
 list and non-list, R 182
 matrices, R 219
 matrix and scalar, R 219
 operation, R 292
 rational functions, R 665
 scalar and matrix, R 219
 scalar and matrix list, R 221
 scalar and vector, R 211
 vector and scalar, R 211
 vectors, R 211
 Addition of a Method, *P 34*
 Additive Arithmetic for Lists, *R 182*
AdditiveInverse, R 290
AdditiveInverseAttr, R 290
AdditiveInverseImmutable, R 290
AdditiveInverseMutable, R 290
AdditiveInverseOp, R 290
AdditiveInverseSameMutability, R 290
AdditiveInverseSM, R 290
AdditiveNeutralElement, R 554
AddRelator, R 485
AddRowVector, R 213
AddRule, R 341
AddRuleReduced, R 341
AddSet, R 193
AdjointAssociativeAlgebra, R 646
AdjointBasis, R 618
AdjointMatrix, R 646
AdjointModule, R 631
 Advanced Features of GAP, *R 30*
 Advanced List Manipulations, *R 201*
 Advanced Methods for Dixon-Schneider Calculations, *R 748*
AffineAction, R 445
AffineActionLayer, R 445
AffineOperation, R 445
AffineOperationLayer, R 445
 A First Attempt to Implement Elements of Residue Class Rings, *P 44*
Agemo, R 361
AgGroup, T 79
Algebra, R 609
AlgebraByStructureConstants, R 612
AlgebraGeneralMappingByImages, R 623
AlgebraHomomorphismByImages, R 623
AlgebraHomomorphismByImagesNC, R 623
AlgebraicExtension, R 686
 Algebraic Structure, *T 69*
Algebras, *T 61*
AlgebraWithOne, R 609
AlgebraWithOneGeneralMappingByImages, R 624
AlgebraWithOneHomomorphismByImages, R 624
AlgebraWithOneHomomorphismByImagesNC, R 624
AllBlocks, R 403
AllIrreducibleSolvableGroups, R 525
AllLibraryGroups, R 513
AllPrimitiveGroups, R 513
AllSmallGroups, R 516
AllTransitiveGroups, R 513
Alpha, R 818
AlternatingGroup, R 507
 and, R 167
 for filters, R 168
 An Example of Advanced Dixon-Schneider Calculations, *R 750*
 An Example of a GAP Package, *E 36*
ANFAutomorphism, R 591
AntiSymmetricParts, R 783
 antisymmetric relation, R 311
Append, R 175
AppendTo, R 94
 for streams, R 100
Apple, R 834
ApplicableMethod, R 77, *T 75*

ApplicableMethod, *R* 77
Applicable Methods and Method Selection, *P* 12
ApplicableMethodTypes, *R* 77
Apply, *R* 196
ApplyFunc, *T* 79
ApplySimpleReflection, *R* 643
ApproximateSuborbitsStabilizerPermGroup,
 R 420
ARCH_IS_MAC, *R* 35
ARCH_IS_UNIX, *R* 35
ARCH_IS_WINDOWS, *R* 35
arg, special function argument, *R* 46
ArithmetricElementCreator, *P* 42
Arithmetic for External Representations of
 Polynomials, *R* 685
Arithmetic for Lists, *R* 180
Arithmetic Issues in the Implementation of New
 Kinds of Lists, *P* 27
Arithmetic Operations for Class Functions, *R* 765
Arithmetic Operations for Elements, *R* 292
Arithmetic Operations for General Mappings, *R* 305
Arithmetic Operators, *R* 48
Arrangements, *R* 146
arrow notation for functions, *R* 57
AsAlgebra, *R* 618
AsAlgebraWithOne, *R* 619
AsBinaryRelationOnPoints, *R* 312
AsBlockMatrix, *R* 235
AscendingChain, *R* 367
AsDivisionRing, *R* 573
AsDuplicateFreeList, *R* 195
A Second Attempt to Implement Elements of
 Residue Class Rings, *P* 46
AsField, *R* 573
AsFreeLeftModule, *R* 570
AsGroup, *R* 346
AsGroupGeneralMappingByImages, *R* 382
AsLeftIdeal, *R* 560
AsLeftModule, *R* 568
AsList, *R* 267
AsMagma, *R* 316
AsMonoid, *R* 540
AsPolynomial, *R* 667
AsRightIdeal, *R* 560
AsRing, *R* 557
AsSemigroup, *R* 534
Assert, *R* 80
AssertionLevel, *R* 80
Assertions, *R* 80
AsSet, *R* 267
AssignGeneratorVariables, *R* 328
assignment, *T* 22
 to a list, *R* 173
 to a record, *R* 258
 variable, *R* 50
Assignments, *R* 50
AssignNiceMonomorphismAutomorphismGroup,
 R 388
AssociatedPartition, *R* 151
AssociatedReesMatrixSemigroupOfDClass, *R* 539
Associates, *R* 563
associativity, *R* 48
AssocWordByLetterRep, *R* 333
AsSomething, *T* 70
AsSortedList, *R* 267
AsSSortedList, *R* 267
AsStruct, *R* 284
AsSubalgebra, *R* 619
AsSubalgebraWithOne, *R* 619
AsSubgroup, *R* 347
AsSubgroupOfWholeGroupByQuotient, *R* 472
AsSubmagma, *R* 317
AsSubmonoid, *R* 540
AsSubsemigroup, *R* 534
AsSubspace, *R* 594
AsSubstruct, *R* 287
AsTransformation, *R* 550
AsTransformationNC, *R* 550
AsTwoSidedIdeal, *R* 560
AsVectorSpace, *R* 593
at exit functions, *R* 73
ATLAS Irrationalities, *R* 158
AtlasIrrationality, *R* 160
atomic irrationalities, *R* 158
Attributes, *R* 120, *T* 72
Attributes and Operations for Algebras, *R* 617
Attributes and Properties for (Near-)Additive
 Magmas, *R* 554
Attributes and Properties for Collections, *R* 268
Attributes and Properties for Magmas, *R* 318
Attributes and Properties for Matrix Groups, *R* 425
Attributes and Properties of Character Tables,
 R 728
Attributes and Properties of Elements, *R* 288
Attributes of and Operations on Equivalence
 Relations, *R* 313

Attributes of Tables of Marks, *R 703*
 Attributes vs. Record Components, *T 81*
AttributeValueNotSet, R 121
AugmentationIdeal, R 658
AugmentedCosetTableInWholeGroup, R 466
AugmentedCosetTableMtc, R 466
AugmentedCosetTableRrs, R 466
 Augmented Coset Tables and Rewriting, *R 466*
 Authorship and Maintenance, *T 12*
 automatic loading of gap packages, R 839
AutomorphismDomain, R 387
AutomorphismGroup, R 387
 for groups with pcgs, R 446
 automorphism group, of number fields, R 591
 Automorphisms and Equivalence of Character Tables, *R 757*
AutomorphismsOfTable, R 731

B

b_N , R 158
 backslash character, R 247
 backspace character, R 247
Backtrace, T 86
 GAP3 name for **Where**, R 70
Backtrack, *R 422*
BANNER, R 844
BaseFixedSpace, R 226
BaseIntersectionIntMats, R 236
BaseIntMat, R 236
BaseMat, R 229
BaseMatDestructive, R 229
BaseOfGroup, N 20, R 419
BaseOrthogonalSpaceMat, R 229
BasePointOfSchreierTransversal, N 17
 Bases of Vector Spaces, *R 595*
BaseStabChain, R 419
BaseSteinitzVectors, R 229
 Basic Actions, *R 393*
 Basic Groups, *R 506*
 Basic Operations for Class Functions, *R 763*
 Basic Operations for Lists, *R 171*
BasicWreathProductOrdering, R 280
Basis, R 596
BasisNC, R 596
BasisVectors, R 597
Bell, R 145
Bernoulli, R 145
BestQuoInt, R 128

BestSplittingMatrix, R 749
BiAlgebraModule, R 627
BiAlgebraModuleByGenerators, R 627
bibtex, E 26
BilinearFormMat, R 642
 binary relation, R 310
BinaryRelationByElements, R 310
BinaryRelationOnPoints, R 312
BinaryRelationOnPointsNC, R 312
 Binary Relations on Points, *R 312*
BinaryRelationTransformation, R 551
BindGlobal, P 31, R 45
Binomial, R 144
 blank, R 41
BlistList, R 206
 Block Matrices, *R 235*
BlockMatrix, R 235
Blocks, R 403
BlocksInfo, R 736
 Block Systems, *R 403*
BlownUpMat, R 231
BlownUpVector, R 231
BlowUpIsomorphism, R 426
 BNF, R 59
 body, R 55
BombieriNorm, R 673
 Boolean Lists Representing Subsets, *R 206*
 bound, R 43
 Brauer character, R 770
BrauerCharacterValue, R 793
BrauerTable, R 722
BrauerTableOp, R 722
BravaisGroup, R 429
BravaisSubgroups, R 429
BravaisSupergroups, R 429
Break, *R 55*
 break loop message, R 69
Break Loops, *R 67*
 break loops, T 20
 break statement, R 55
 browsing backwards, R 22
 browsing backwards one chapter, R 23
 browsing forward, R 22
 browsing forward one chapter, R 23
 browsing the next section browsed, R 23
 browsing the previous section browsed, R 23
 Browsing through the Sections, *R 22*
 bug reports, see If Things Go Wrong, R 831

Building new orderings, *R* 276
buildman.pe, *E* 27

C

C, Category mark-up, *E* 16
 c_N , *R* 158
 Calculating with Group Automorphisms, *R* 388
 Calendar Arithmetic, *R* 254
CallFuncList, *R* 62
 Calling a function with a list argument that is interpreted as several arguments, *R* 62
 Calling of and Communication with External Binaries, *E* 39
 Cancellation Tests for Rational Functions, *R* 685
CanComputeIndex, *R* 379
CanComputeIsSubset, *R* 379
CanComputeSize, *R* 379
CanComputeSizeAnySubgroup, *R* 379
 candidates, for permutation characters, *R* 789
CanEasilyCompareElements, *R* 291
CanEasilyCompareElementsFamily, *R* 291
CanEasilyComputePcgs, *R* 432
CanEasilySortElements, *R* 291
CanEasilySortElementsFamily, *R* 291
CanEasilyTestMembership, *R* 379
CanonicalBasis, *R* 596
 canonical basis, for matrix spaces, *R* 603
 for row spaces, *R* 603
CanonicalElt, *N* 14
CanonicalGenerators, *R* 642
CanonicalPcElement, *R* 434
CanonicalPcgs, *R* 437
CanonicalPcgsByGeneratorsWithImages, *R* 439
CanonicalRepresentativeDeterminatorOf-ExternalSet, *R* 406
CanonicalRepresentativeOfExternalSet, *R* 406
CanonicalRightCosetElement, *R* 353
 Carmichael's lambda function, *R* 136
 carriage return character, *R* 247
CartanMatrix, *R* 641
CartanSubalgebra, *R* 638
Cartesian, *R* 197
Categories, *R* 117
 Categories and Properties of Algebras, *R* 616
 Categories for Streams and the StreamsFamily, *R* 96
 Categories of Associative Words, *R* 326
 Categories of Matrices, *R* 218
CategoriesOfObject, *R* 119

Categories of Words and Nonassociative Words, *R* 321
CategoryCollections, *P* 16, *R* 264
CategoryFamily, *P* 16
 Catering for Plain Text and HTML Formats, *E* 25
Center, *R* 319
 center, *R* 318
CentralCharacter, *R* 773
 central character, *R* 773
CentralIdempotentsOfAlgebra, *R* 621
 centraliser, *R* 318
Centralizer, *R* 318
 for groups with pcgs, *R* 446
CentralizerInGLnZ, *R* 429
CentralizerModulo, *R* 368
CentralizerSizeLimitConsiderFunction, *R* 447
CentralNormalSeriesByPcgs, *R* 441
Centre, *R* 319
 for groups with pcgs, *R* 446
 centre, of a character, *R* 772
CentreOfCharacter, *R* 772
CF, *R* 586
ChainHomomorphicImage, *N* 20
ChainStatistics, *N* 20
ChainSubgroup, *N* 19
ChainSubgroupByDirectProduct, *N* 21
ChainSubgroupByHomomorphism, *N* 21
ChainSubgroupByProjectionFunction, *N* 21
ChainSubgroupByPSubgroupOfAbelian, *N* 21
ChainSubgroupBySiftFunction, *N* 21
ChainSubgroupByStabiliser, *N* 20
ChainSubgroupByTrivialSubgroup, *N* 21
ChainSubgroupQuotient, *N* 21
ChangedBaseGroup, *N* 20
 Changed Command Line Options, *T* 77
 Changed Functionality, *T* 78
 Changed Variable Names, *T* 79
 Changes from Earlier Versions, *T* 13
ChangeStabChain, *R* 421
 Changing Presentations, *R* 485
 Changing the Help Viewer, *R* 23
 Changing the Representation, *R* 285
 Changing the Structure, *R* 284, *T* 70
 Chapters and Sections, *E* 15
CHAR_INT, *R* 253
CHAR_SINT, *R* 253
Character, *R* 768
 Character Conversion, *R* 252

CharacterDegrees, R 728
Character Degrees and Derived Length, *R* 818
Characteristic, R 288
 characteristic, for class functions, R 767
CharacteristicPolynomial, R 230
 characteristic polynomial, for field elements, R 575
CharacterNames, R 732
 characters, R 761
 permutation, R 789
 symmetrizations of, R 782
CharacterTable, R 722
 Character Table Categories, *R* 724
CharacterTableDirectProduct, R 752
CharacterTableFactorGroup, R 752
CharacterTableIsoclinic, R 753
 character tables, R 721
 access to, R 721
 calculate, R 721
 infix operators, R 728
 of groups, R 721
CharacterTableWithSortedCharacters, R 754
CharacterTableWithSortedClasses, R 755
CharacterTableWreathSymmetric, R 754
 character value, of group element using powering operator, R 766
CharsFamily, R 249
CharTable, T 79
CheapFactorsInt, R 133
CheckFixedPoints, R 807
CheckForHandlingByNiceBasis, R 608
CheckPermChar, R 814
ChevalleyBasis, R 640
ChiefNormalSeriesByPcgs, R 442
ChiefSeries, R 365
ChiefSeriesThrough, R 365
ChiefSeriesUnderAction, R 365
ChineseRem, R 129
 Chinese remainder, R 130
Chomp, R 252
CIUnivPols, R 665
ClassElementLattice, R 370
 classes, real, R 733
ClassesSolvableGroup, R 446
ClassFunction, R 768
 class function, R 761
 class function objects, R 761
 class functions, R 804
 as ring elements, R 765
ClassFunctionSameType, R 769
 Class Fusions between Character Tables, *R* 799
 Classical Groups, *R* 508
ClassMultiplicationCoefficient, for character tables, R 740
 class multiplication coefficient, R 741
ClassNames, R 732
ClassNamesTom, R 704
ClassOrbit, R 733
ClassPermutation, R 756
ClassPositionsOfAgemo, R 734
ClassPositionsOfCentre, for characters, R 772
 for character tables, R 734
ClassPositionsOfDerivedSubgroup, R 734
ClassPositionsOfDirectProduct-Decompositions, R 734
ClassPositionsOfElementaryAbelianSeries, R 734
ClassPositionsOfFittingSubgroup, R 734
ClassPositionsOfKernel, R 772
ClassPositionsOfLowerCentralSeries, R 734
ClassPositionsOfMaximalNormalSubgroups, R 734
ClassPositionsOfMinimalNormalSubgroups, R 734
ClassPositionsOfNormalClosure, R 735
ClassPositionsOfNormalSubgroup, R 759
ClassPositionsOfNormalSubgroups, R 734
ClassPositionsOfSupersolvableResiduum, R 735
ClassPositionsOfUpperCentralSeries, R 734
ClassRoots, R 733
ClassStructureCharTable, R 741
ClassTypesTom, R 703
CleanedTailPcElement, R 435
ClearCacheStats, R 83
ClearProfile, R 82
 clone, an object, R 113
CloseMutableBasis, R 601
CloseStream, R 97
ClosureGroup, R 349
ClosureGroupAddElm, R 349
ClosureGroupCompare, R 349
ClosureGroupDefault, R 349
ClosureGroupIntest, R 349
ClosureLeftModule, R 569
ClosureNearAdditiveGroup, R 555
 Closure Operations and Other Constructors, *R* 312
ClosureRing, R 557

Closures of (Sub)groups, *R 349*
ClosureSomething, *T 70*
ClosureStruct, *R 284*
ClosureSubgroup, *R 349*
ClosureSubgroupNC, *R 349*
Coboundaries, *R 651*
Cochain, *R 650*
CochainSpace, *R 650*
Cocycles, *R 651*
cocycles, *R 375*
CodePcGroup, *R 457*
CodePcgs, *R 457*
Coding a Pc Presentation, *R 457*
coefficient, binomial, *R 144*
Coefficient List Arithmetic, *R 213*
Coefficients, *R 597*
coefficients, for cyclotomics, *R 156*
CoefficientsAndMagmaElements, *R 659*
CoefficientsFamily, *R 682*
CoefficientsMultiadic, *R 129*
CoefficientsOfLaurentPolynomial, *R 674*
CoefficientsOfUnivariatePolynomial, *R 667*
CoefficientsOfUnivariateRationalFunction,
R 667
CoefficientsQadic, *R 129*
CoefficientsRing, *R 675*
CoeffsCyc, *R 156*
CoeffsMod, *R 214*
cohomology, *R 375*
COHORTS_PRIMITIVE_GROUPS, *R 523*
cokernel, *T 55*
CoKernelOfAdditiveGeneralMapping, *R 307*
CoKernelOfMultiplicativeGeneralMapping,
R 306
CollapsedMat, *R 810*
Collected, *R 195*
Collection Families, *R 263*
CollectionsFamily, *P 20, R 263*
Coloring the Prompt and Input, *R 38*
ColorPrompt, *R 38*
ColumnIndexOfReesMatrixSemigroupElement,
R 539
ColumnIndexOfReesZeroMatrixSemigroup-
Element, *R 539*
Combinations, *R 146*
Combinations, Arrangements and Tuples, *R 146*
CombinatorialCollector, *R 451*
Combinatorial Numbers, *R 144*
Comm, *R 292*
for words, *R 330*
Command Line Options, *R 27*
command mark-up, *E 16*
comments, *R 41, T 19*
CommutativeDiagram, *R 807*
CommutatorFactorGroup, *R 368*
CommutatorLength, *R 359*
for character tables, *R 730*
CommutatorSubgroup, *R 358*
Compacted, *R 194*
CompanionMat, *R 232*
CompareVersionNumbers, *R 842*
comparison, fp semigroup elements, *R 545*
operation, *R 291*
rational functions, *R 665*
Comparison of Associative Words, *R 329*
Comparison of Class Functions, *R 764*
Comparison of Elements of Finitely Presented
Groups, *R 460*
Comparison of Elements of Finitely Presented
Semigroups, *R 545*
Comparison of Permutations, *R 408*
Comparison of Rational Functions, *R 665*
Comparison of Words, *R 323*
Comparison Operations for Elements, *R 291*
Comparisons, *R 47*
comparisons, of booleans, *R 166*
of lists, *R 179*
Comparisons of Booleans, *R 166*
Comparisons of Cyclotomics, *R 158*
Comparisons of Lists, *R 179*
Comparisons of Records, *R 260*
Comparisons of Strings, *R 249*
Compatibility Mode, *T 87*
Compatibility of Residue Class Rings with Prime
Fields, *P 56*
CompatibleConjugacyClasses, *R 726*
CompatiblePairs, *R 455*
Compilation, *R 826*
Compiling Library Code, *R 36*
Complementclasses, *R 358*
ComplementclassesEA, *R 377*
ComplementIntMat, *R 237*
ComplementSystem, *R 361*
CompleteSchreierTransversal, *N 17*
Completion Files, *R 34*
ComplexConjugate, *R 161*

for class functions, R 767
ComplexificationQuat, R 613
 Component Objects, *P* 21
 Components of a Dixon Record, *R* 749
 Components versus Attributes, *P* 39
CompositionMapping, R 300
 for Frobenius automorphisms, R 583
CompositionMapping2, R 300
CompositionMaps, R 804
CompositionOfStraightLinePrograms, R 337
CompositionSeries, R 365
 for groups with pcgs, R 446
ComputedBrauerTables, R 722
ComputedClassFusions, R 800
ComputedIndicators, R 740
ComputedIsPSolvableCharacterTables, R 739
ComputedPowerMaps, R 796
ComputedPrimeBlockss, R 735
 Computing a Pcg, *R* 432
 Computing a Permutation Representation, *R* 412
 Computing Pc Groups, *R* 452
 Computing Possible Permutation Characters, *R* 789
 Computing the Irreducible Characters of a Group,
 R 745
Concatenation, R 194
 concatenation, of lists, R 194
Conductor, R 156
ConfluentRws, R 341
Congruences, for character tables, R 812
 Congruences for semigroups, *R* 537
ConjugacyClass, R 355
 Conjugacy Classes, *R* 355
ConjugacyClasses, attribute, R 355
 for character tables, R 725
 for groups with pcgs, R 446
 for linear groups, R 512
ConjugacyClassesByOrbits, R 356
ConjugacyClassesByRandomSearch, R 356
 Conjugacy Classes in Classical Groups, *R* 512
 Conjugacy Classes in Solvable Groups, *R* 446
ConjugacyClassesMaximalSubgroups, R 369
ConjugacyClassesPerfectSubgroups, R 372
ConjugacyClassesSubgroups, R 369
ConjugacyClassSubgroups, R 369
 conjugate, matrix, R 220
 of a word, R 330
ConjugateDominantWeight, R 643
ConjugateDominantWeightWithWord, R 643
ConjugateGroup, R 346
Conjugates, R 576
ConjugateSubgroup, R 348
ConjugateSubgroups, R 348
 conjugation, R 393
ConjugatorAutomorphism, R 386
ConjugatorAutomorphismNC, R 386
ConjugatorIsomorphism, R 385
ConjugatorOfConjugatorIsomorphism, R 386
ConnectGroupAndCharacterTable, R 726
ConsiderKernels, R 812
ConsiderSmallerPowerMaps, R 813
ConsiderStructureConstants, R 804
ConsiderTableAutomorphisms, R 815
 constants, T 21
ConstantTimeAccessList, R 190
 constituent, of a group character, R 771
ConstituentsCompositionMapping, R 301
ConstituentsOfCharacter, R 772
 Constructing Algebras as Free Algebras, *R* 610
 Constructing Algebras by Generators, *R* 609
 Constructing Algebras by Structure Constants,
 R 611
 Constructing Character Tables from Others, *R* 751
 Constructing Domains, *R* 283
 Constructing Lie algebras, *R* 635
 Constructing Pc Groups, *R* 450
 Constructing Subdomains, *R* 287
 Constructing Tables of Marks, *R* 698
 Constructing Vector Spaces, *R* 593
 Construction of Abelian Number Fields, *R* 586
 Construction of Stabilizer Chains, *R* 417
 Constructors for Basic Groups, *R* 512
ContainedCharacters, R 811
ContainedDecomposables, R 811
ContainedMaps, R 806
ContainedPossibleCharacters, R 809
ContainedPossibleVirtualCharacters, R 810
ContainedSpecialVectors, R 809
ContainedTom, R 708
ContainingTom, R 708
 continuation, E 24
ContinuedFractionApproximationOfRoot, R 140
ContinuedFractionExpansionOfRoot, R 140
 Continued Fractions, *R* 140
 continue statement, R 55
 Conventions for Character Tables, *R* 725
 convert, to a string, R 248

Converting Groups to Finitely Presented Groups, *R* 468
ConvertToCharacterTable, *R* 723
ConvertToCharacterTableNC, *R* 723
ConvertToMatrixRep, *R* 232
ConvertToMatrixRepNC, *R* 232
ConvertToRangeRep, *R* 204
ConvertToStringRep, *R* 248
ConvertToTableOfMarks, *R* 702
ConvertToVectorRep, *R* 212
ConvertToVectorRepNC, *R* 212
ConwayPolynomial, *R* 583
Conway Polynomials, *R* 583
coprime, *R* 48
Copy, *T* 80
copy, *R* 113
 an object, *R* 113
COPY_LIST_ENTRIES, *R* 175
Copying Weak Pointer Objects, *E* 53
CopyOptionsDefaults, *R* 421
Copyrights, *R* 838
CopyStabChain, *R* 421
Core, *R* 357
CorrespondingGeneratorsByModuloPcgs, *R* 439
coset, *R* 352
CosetLeadersMatFFE, *R* 215
Cosets, *R* 352
CosetTable, *R* 462
CosetTableBySubgroup, *R* 463
CosetTableDefaultLimit, *R* 464
CosetTableDefaultMaxLimit, *R* 464
CosetTableFromGensAndRels, *R* 463
CosetTableInWholeGroup, *R* 466
CosetTableOfFpSemigroup, *R* 548
Coset Tables and Coset Enumeration, *R* 462
Coset tables for subgroups in the whole group, *R* 466
CosetTableStandard, *R* 465
CRC, *R* 37
CrcFile, *R* 94
 example, *R* 37
CRC Numbers, *R* 37
CreateCompletionFiles, *R* 34
CreateCompletionFilesPackage, *E* 40
CreateCompletionFilesPkg, *R* 843
Creating Attributes and Properties, *P* 17
Creating Categories, *P* 16
Creating Character Tables, *R* 721
Creating Class Functions from Values Lists, *R* 768
Creating Class Functions using Groups, *R* 769
Creating Families, *P* 18
Creating Finite Fields, *R* 581
Creating Finitely Presented Groups, *R* 459
Creating Finitely Presented Semigroups, *R* 544
Creating Group Homomorphisms, *R* 380
Creating Groups, *R* 345
Creating hom cosets and quotient groups, *N* 14
Creating Mappings, *R* 300
Creating Objects, *P* 20
Creating Operations, *P* 18
Creating Other Filters, *P* 18
Creating Own Arithmetic Objects, *P* 41
Creating Permutations, *R* 410
Creating Presentations, *R* 477
Creating Representations, *P* 17
Creating Types, *P* 20
Creation of Algebraic Extensions, *R* 686
Creation of Rational Functions, *R* 684
Credit, *R* 21
CrystGroupDefaultAction, *R* 430
Cycle, *R* 401
CycleLength, *R* 401
CycleLengths, *R* 401
Cycles, *R* 401
CycleStructureClass, *R* 773
CycleStructurePerm, *R* 409
CyclicExtensionsTom, *R* 708
CyclicGroup, *R* 506
CyclotomicField, *R* 586
 cyclotomic field elements, *R* 154
 cyclotomic fields, canonicalbasis, *R* 589
CyclotomicPolynomial, *R* 671
Cyclotomic Polynomials, *R* 671
Cyclotomics, *R* 154
 cyclotomics, defaultfield, *R* 587

D

d_N, *R* 158
Darstellungsgruppe, see **EpimorphismSchurCover**, *R* 378
DataType, *R* 124
 data type, unknown, *R* 164
DayDMY, *R* 255
DaysInMonth, *R* 254
DaysInYear, *R* 254
Debugging, *T* 86
Debugging Recursion, *R* 84

DEC, R 240
 Declaration and Implementation Part, *E 38, P 33*
DeclareAttribute, P 31
 example, P 37
DeclareAutoPackage, R 843
DeclareAutoreadableVariables, E 40
 DeclareAutoreadableVariables, *E 40*
DeclareCategory, P 31
DeclareFilter, P 31
DeclareGlobalFunction, P 31
DeclareGlobalVariable, P 32
DeclareHandlingByNiceBasis, R 607
DeclareInfoClass, R 79
DeclareOperation, P 31
DeclarePackage, R 843
DeclarePackageAutoDocumentation, R 843
DeclarePackageDocumentation, R 843
DeclareProperty, P 31
DeclareRepresentation, P 31
 belongs to implementation part, P 33
 example, P 38
DeclareSynonym, P 32
DeclareSynonymAttr, P 32
DecodeTree, R 495
 DecodeTree, *R 495*
 decompose, a group character, R 771
DecomposedFixedPointVector, R 708
DecomposeTensorProduct, R 652
Decomposition, R 240
DecompositionInt, R 241
DecompositionMatrix, R 737
 decomposition matrix, R 240
Decompositions, *R 240*
Decreased, R 780
DefaultField, R 573
 for cyclotomics, R 157
 for finite field elements, R 581
DefaultFieldByGenerators, R 573
DefaultFieldOfMatrix, R 221
DefaultFieldOfMatrixGroup, R 425
DefaultRing, R 556
 for finite field elements, R 581
DefaultRingByGenerators, R 557
DefaultStabChainOptions, R 418
 Defining a Pcg, Yourself, *R 432*
DefiningPolynomial, R 574
DefiningQuotientHomomorphism, R 472
DegreeFFE, R 580
DegreeIndeterminate, R 669
DegreeOfBinaryRelation, R 311
DegreeOfCharacter, R 771
DegreeOfLaurentPolynomial, R 668
DegreeOfTransformation, R 549
DegreeOfTransformationSemigroup, R 536
DegreeOverPrimeField, R 574
Delta, R 818
Denominator, T 79
 denominator, of a rational, R 143
DenominatorCyc, R 157
DenominatorOfModuloPcgs, R 438
DenominatorOfRationalFunction, R 667
DenominatorRat, R 143
DenseHashTable, N 11
 Dense hash tables, *N 11*
DenseIntKey, N 11
 deprecated, R 843
DepthOfPcElement, R 434
DepthOfUpperTriangularMatrix, R 230
DepthVector, T 79
Derangements, R 148
Derivations, R 636
Derivative, R 670
DerivedLength, R 366
DerivedSeriesOfGroup, R 366
DerivedSubgroup, R 358
DerivedSubgroupsTom, R 707
DerivedSubgroupsTomPossible, R 707
DerivedSubgroupsTomUnique, R 707
DerivedSubgroupTom, R 707
DescriptionOfRootOfUnity, R 157
 Designing new Multiplicative Objects, *P 64*
Determinant, R 222
 determinant character, R 773
DeterminantIntMat, R 240
DeterminantMat, R 222
DeterminantMatDestructive, R 222
DeterminantMatDivFree, R 222
 Determinant of an integer matrix, *R 240*
DeterminantOfCharacter, R 773
 Developing rewriting systems, *R 343*
DiagonalizeIntMat, R 238
DiagonalizeMat, R 227
DiagonalMat, R 223
DiagonalOfMat, R 230
Dictionaries, *N 9*
DictionaryByPosition, N 10

Difference, R 271
DifferenceBlist, R 207
 Different Notions of Generation, *T 81*
DihedralGroup, R 507
Dimension, R 570
DimensionOfHighestWeightModule, R 652
DimensionOfMatrixGroup, R 425
DimensionOfVectors, R 602
DimensionsLoewyFactors, R 367
DimensionsMat, R 221
 Directories, *R 90*
DirectoriesLibrary, R 90
DirectoriesPackageLibrary, R 841
DirectoriesPackagePrograms, R 842
DirectoriesSystemPrograms, R 91
Directory, R 90
DirectoryContents, R 91
DirectoryCurrent, R 90
DirectoryTemporary, R 90
DirectProduct, R 500
 Direct product chain subgroups, *N 21*
DirectProductOp, R 500
 Direct Products, *R 500*
DirectSumDecomposition, R 621
 for Lie algebras, R 640
 Direct Sum Decompositions, *R 640*
DirectSumOfAlgebraModules, R 632
 for Lie algebras, R 655
DirectSumOfAlgebras, R 620
DisableAttributeValueStoring, R 122
 disable automatic loading, R 839
Discriminant, R 670
Display, R 66
 for character tables, R 768
 for tables of marks, R 700
DisplayCacheStats, R 83
DisplayCompositionSeries, R 365
DisplayEggBoxOfDClass, R 538
DisplayImfInvariants, R 527
DisplayInformationPerfectGroups, R 520
DisplayOptions, R 743
DisplayOptionsStack, R 88
DisplayProfile, R 82
DisplayRevision, R 83
DistancesDistributionMatFFVecFFE, R 215
DistancesDistributionVecFFEsVecFFE, R 215
DistanceVecFFE, R 215
 Distinguished Subalgebras, *R 637*

division, R 48
 operation, R 292
DivisionRingByGenerators, R 573
 division rings, R 572
 divisors, of an integer, R 133
DivisorsInt, R 133
 Dixon-Schneider algorithm, R 748
DixonInit, R 748
DixonRecord, R 748
DixonSplit, R 749
DixontinI, R 748
DMYDay, R 255
DMYhmsSeconds, R 256
DnLattice, R 781
DnLatticeIterative, R 782
do, R 53
 document formats, for help books, E 43
 document formats (text, dvi, ps, pdf, html), R 23
Domain, R 288
DomainByGenerators, R 288
 Domain Categories, *R 285*
 Domain Constructors, *T 70*
Domains, *R 110*
 Domains as Sets, *T 68*
 Domains Generated by Class Functions, *R 794*
 Domains of Subspaces of Vector Spaces, *R 595*
DominantCharacter, R 651
DominantWeights, R 651
DoubleCoset, R 354
DoubleCosetRepsAndSizes, R 355
 Double Cosets, *R 354*
DoubleCosets, operation, R 354
DoubleCosetsNC, operation, R 354
DoubleHashArraySize, N 11
 doublequote character, R 247
 doublequotes, R 245
DownEnv, R 71, T 86
 Dummy Streams, *R 105*
 duplicate free, R 190
DuplicateFreeList, R 195
 Duplication of Lists, *R 177*
 Duplication of Objects, *R 113*
DxIncludeIrreducibles, R 749

E
E, R 154
 e_N , R 158
EANormalSeriesByPcgs, R 440

Earns, R 402
EB, R 158
EC, R 158
Echelonized Matrices, *R* 227
ED, R 158
Edit, R 74
Editing Files, *R* 74
Editor Support, *R* 75
EE, R 158
EF, R 158
Efficiency of Homomorphisms, *R* 383
EG, R 158
EggBoxOfDClass, R 537
EH, R 158
EI, R 159
Eigenspaces, R 226
Eigenvalues, R 226
EigenvaluesChar, R 774
Eigenvectors, R 226
Eigenvectors and eigenvalues, *R* 226
EJ, R 159
EK, R 159
EL, R 159
ElementaryAbelianGroup, R 507
ElementaryAbelianSeries, R 366
ElementaryAbelianSeriesLargeSteps, R 366
Elementary Divisors, *R* 227
ElementaryDivisorsMat, R 227
ElementaryDivisorsMatDestructive, R 227
Elementary Operations for a Pcs, *R* 433
Elementary Operations for a Pcs and an Element, *R* 434
Elementary Operations for Integers, *R* 126
Elementary Operations for Rationals, *R* 142
Elementary Tietze Transformations, *R* 488
ElementOfFpGroup, R 461
ElementOfFpSemigroup, R 546
ElementOfMagmaRing, R 659
ElementOrdersPowerMap, R 797
ElementProperty, R 422
Elements, R 268, T 79
elements, T 24
 definition, R 109
 of a list or collection, R 268
Elements as equivalence classes, *R* 109
ElementsFamily, P 20, R 263
Elements in Algebraic Extensions, *R* 686
Elements of Finitely Presented Groups, *T* 84
 Elements of Free Magma Rings, *R* 659
 Elements of pc groups, *R* 449
ElementsStabChain, R 420
Elements with Prescribed Images, *R* 398
element test, for lists, R 179
elif, R 51
EliminatedWord, R 331
EliminationOrdering, R 679
ElmWPObj, E 52
else, R 51
EM, R 159
emacs, R 75
email addresses, T 16
Embedding, R 301
 example for direct products, R 500
 example for semidirect products, R 502
 example for wreath products, R 503
 for group products, R 505
 for Lie algebras, R 635
 for magma rings, R 659
embeddings, find all, R 389
Embeddings and Projections for Group Products, *R* 505
EmptyBinaryRelation, R 310
EmptyMatrix, R 223
EmptySCTable, R 611
EmptyStabChain, R 421
EnableAttributeValueStoring, R 122
End, R 605
end, R 55
Enforcing Property Tests, *P* 36
Enlarging Internally Represented Lists, *R* 179
Enumerator, R 264
enumerator, T 49
EnumeratorByBasis, R 598
EnumeratorByFunctions, R 265
Enumerators, *R* 204
EnumeratorSorted, R 264
environment, R 55
EpimorphismFromFreeGroup, R 349
EpimorphismNilpotentQuotient, R 473
EpimorphismPGroup, R 473
EpimorphismQuotientSystem, R 473
epimorphisms, find all, R 389
EpimorphismSchurCover, R 378
equality, associative words, R 329
 elements of finitely presented groups, R 460
 nonassociative words, R 323

of records, R 260
 operation, R 291
 pcwords, R 449
Equality and Comparison of Domains, *R* 283
equality test, R 47
 for permutations, R 408
equivalence class, R 314
Equivalence Classes, *R* 314
EquivalenceClasses, attribute, R 314
EquivalenceClassOfElement, R 314
EquivalenceClassOfElementNC, R 314
EquivalenceClassRelation, R 314
 equivalence relation, R 313
EquivalenceRelationByPairs, R 313
EquivalenceRelationByPairsNC, R 313
EquivalenceRelationByPartition, R 313
EquivalenceRelationByPartitionNC, R 313
EquivalenceRelationByProperty, R 313
EquivalenceRelationByRelation, R 313
EquivalenceRelationPartition, R 313
 Equivalence Relations, *R* 313
ER, R 159
Error, R 72
Error, *R* 72
ErrorCount, R 72
ErrorCount, *R* 72
ErrorNoTraceBack, R 68
 errors, syntax, R 64
ES, R 159
 escaped characters, R 247
 escaping non-special characters, R 247
ET, R 159
EU, R 159
EuclideanDegree, R 564
EuclideanQuotient, R 564
EuclideanRemainder, R 565
 Euclidean Rings, *R* 564
 Euler's totient function, R 135
EulerianFunction, R 364
EulerianFunctionByTom, R 709
EV, R 159
EvalStraightLineProgElm, R 339
EvalString, R 254
 evaluation, R 42
 strings, R 253
EW, R 159
EX, R 159
ExactSizeConsiderFunction, R 374
Example – Constructing Enumerators, *P* 24
Example – Constructing Iterators, *P* 26
Example: Groups with a decomposition as semidirect product, *P* 41
Example: Groups with a word length, *P* 41
Example: M-groups, *P* 40
Examples, Lists, and Verbatim, *E* 20
Exec, R 108
Exec, *R* 108
 execution, R 49
 exit, R 73
 expanded form of monomials, R 683
Expert Windows installation, *R* 837
Exponent, R 364
 for character tables, R 730
 exponent, of the prime residue group, R 136
 exponentiation, operation, R 292
ExponentOfPcElement, R 434
ExponentsConjugateLayer, R 435
ExponentsOfCommutator, R 435
ExponentsOfConjugate, R 435
ExponentsOfPcElement, R 434
ExponentsOfRelativePower, R 435
Exponents of Special Products, *R* 435
ExponentSumWord, R 330
ExponentSyllable, R 332
Expressing Group Elements as Words in Generators, *R* 349
Expressions, *R* 42
ExtendedGroup, N 20
ExtendedPcgs, R 437
Extending the Range of Definition of an Existing Operation, *P* 35
ExtendSchreierTransversal, N 17
ExtendSchreierTransversalShortCube, N 17
ExtendSchreierTransversalShortTree, N 17
ExtendStabChain, R 421
Extension, R 454
ExtensionNC, R 454
ExtensionRepresentatives, R 455
Extensions, R 454
Extensions of the p-adic Numbers, *R* 689
ExteriorPowerOfAlgebraModule, R 655
ExternalOrbit, R 405
ExternalOrbits, R 405
ExternalOrbitsStabilizers, R 405
External Representation, *P* 28

External Representation for Nonassociative Words, *R 325*
 external representation of polynomials, *R 683*
ExternalSet, *E 48, R 404*
 external set, *T 48*
External Sets, *R 404*
ExternalSubset, *R 405*
Extract, *R 778*
ExtraspecialGroup, *R 507*
ExtRepDenominatorRatFun, *R 683*
ExtRepNumeratorRatFun, *R 683*
ExtRepOfObj, *P 29*
 external representation, for cyclotomics, *R 157*
ExtRepPolynomialRatFun, *R 683*
EY, *R 159*

F

F, Function mark-up, *E 16*
 f_N , *R 158*
FactorCosetAction, *R 400*
 for fp groups, *R 463*
FactorCosetOperation, *R 463*
FactorFreeSemigroupByRelations, *R 544*
FactorGroup, *R 368*
FactorGroupFpGroupByRels, *R 459*
FactorGroupNC, *R 368*
FactorGroupNormalSubgroupClasses, *R 759*
Factor Groups, *R 368*
 Factor Groups of Polycyclic Groups - Modulo Pcg, *R 438*
 Factor Groups of Polycyclic Groups in their Own Representation, *R 439*
FactorGroupTom, *R 709*
Factorial, *R 144*
Factorization, *R 350*
 factorization, *R 349*
Factors, *R 564*
 of univariate polynomial, *R 672*
FactorsInt, *R 131*
FactorsOfDirectProduct, *R 752*
FactorsSquarefree, *R 672*
Fail, *R 166, T 77*
fail, *R 166*
 fail instead of false, *T 77*
FaithfulModule, *R 631*
 for Lie algebras, *R 649*
Families, *R 115*
FamiliesOfGeneralMappingsAndRanges, *R 309*
FamiliesOfRows, *R 758*
family, *T 31*
FamilyForOrdering, *R 277*
FamilyObj, *R 115*
FamilyPcgs, *R 449*
FamilyRange, *R 309*
FamilySource, *R 309*
FAQ, *R 830*
 Fast access to last hash index, *N 12*
 features, under UNIX, *R 27*
fi, *R 51*
Fibonacci, *R 152*
 Fibonacci and Lucas Sequences, *R 152*
Field, *R 572*
FieldExtension, *R 574*
 field homomorphisms, Frobenius, *R 583*
FieldOfMatrixGroup, *R 425*
FieldOverItselfByGenerators, *R 574*
 fields, *R 572*
File Access, *R 92*
FileDescriptorOfStream, *R 97*
Filename, *R 91*
Filename, *R 91*
File Operations, *R 93*
File Streams, *R 102*
File Structure, *E 32*
File Types, *E 32*
Filtered, *R 198*
Filters, *R 116*
 filters, *T 73*
 Filters Controlling the Arithmetic Behaviour of Lists, *R 181*
Finding Implementations in the Library, *E 33*
Finding Positions in Lists, *R 187*
Finding Submodules, *R 692*
FindS12, *R 647*
Finish Installation and Cleanup, *R 828*
Finite Field Elements, *R 578*
Finitely Presented Lie Algebras, *R 647*
Finitely presented monoids, *R 546*
 finiteness test, for a list or collection, *R 268*
Finite Perfect Groups, *R 518*
First, *R 199*
FittingSubgroup, *R 359*
Flat, *R 195*
FlushCaches, *P 33*
 flush character, *R 247*
 foa triples, *E 46*

For, R 53
ForAll, R 199
 For and While Loops, T 33
ForAny, R 199
 for loop, R 53
 Forming Closures of Domains, T 70
FpElmComparisonMethod, R 460
FpGroupPresentation, R 478
FpGrpMonSmgOfFpGrpMonSmgElement, R 544
FpLieAlgebraByCartanMatrix, R 648
 frame, R 784
FrattiniSubgroup, R 359
 for groups with pcgs, R 446
FreeAlgebra, R 610
FreeAlgebraWithOne, R 610
FreeAssociativeAlgebra, R 610
FreeAssociativeAlgebraWithOne, R 610
FreeGeneratorsOfFpGroup, R 460
FreeGeneratorsOfFpSemigroup, R 545
FreeGeneratorsOfWholeGroup, R 460
FreeGroup, R 327
FreeGroupOfFpGroup, R 460
 Free Groups, Monoids and Semigroups, R 327
FreeLeftModule, R 570
FreeLieAlgebra, R 636
FreeMagma, R 324
FreeMagmaRing, R 658
 Free Magma Rings, R 658
 Free Magmas, R 324
FreeMagmaWithOne, R 324
 Free Modules, R 570
FreeMonoid, R 541
 with example, R 327
FreeMonoidOfRewritingSystem, R 548
FreeProduct, R 505
 Free Products, R 505
FreeSemigroup, R 327
 with examples, R 535
FreeSemigroupOfFpSemigroup, R 545
FreeSemigroupOfRewritingSystem, R 548
 Frobenius automorphism, R 583
FrobeniusAutomorphism, R 583
 FrobeniusAutomorphism, R 583
FrobeniusCharacterValue, R 793
FullMatrixAlgebra, R 613
FullMatrixAlgebraCentralizer, R 621
FullMatrixLieAlgebra, R 636
FullMatrixModule, R 571
FullMatrixSpace, R 602
FullRowModule, R 571
FullRowSpace, R 602
FullTransformationSemigroup, R 536
Function, R 55
function, R 55
FunctionAction, R 404
 function call, R 46
 with arguments, R 46
 with options, R 47
Function Calls, R 46
FunctionOperation, R 843
 functions, R 61
 definition by arrow notation, R 57
 definition of, R 55
 recursive, R 55
 with a variable number of arguments, R 46
FunctionsFamily, R 63
 Functions for Coding Theory, R 215
 Functions for GAP Packages, R 840
 Functions that do nothing, R 63
 Function that Modify Boolean Lists, R 208
Function Types, R 63
 Further Improvements in Implementing Residue Class Rings, P 61
 Further Information about Domains, T 71
 Further Information about Functions, T 43
 Further Information about GAP, T 16
 Further Information about Groups and Homomorphisms, T 58
 Further Information about Lists, T 39
 Further Information about Vector Spaces and Algebras, T 67
 Further Information introducing the System, T 26
FusionCharTableTom, R 715
FusionConjugacyClasses, R 800
FusionConjugacyClassesOp, R 800
 fusions, R 799
FusionsAllowedByRestrictions, R 815
FusionsTom, R 704
G
 G-sets, E 48, R 404
 g_N , R 158
gac, R 35
 Galois Action, R 574
 Galois Conjugacy of Cyclotomics, R 161
GaloisCyc, R 161

for class functions, R 767
GaloisField, R 582
GaloisGroup, of field, R 575
 of rational class of a group, R 357
 Galois Groups of Abelian Number Fields, *R* 591
GaloisMat, R 162
GaloisStabilizer, R 588
GaloisType, R 673
gap.rc, R 33
GAP3, R 34
Gap3CatalogueIdGroup, R 516
GAPDocManualLab, E 41
 GAP for Macintosh OS X, *R* 834
 GAP for MacOS, *R* 835
GAPInfo, R 844
GAPInfo.RootPaths, R 29
GAPInfo.Version, E 40
GapInputPcGroup, R 453
GapInputSCTable, R 611
GAPKB_REW, R 547
gapmacro.tex, E 11
 GAP Root Directory, *R* 89
GasmanLimits, R 86
GasmanMessageStatus, R 86
GasmanStatistics, R 86
 Gaussian algorithm, R 225
GaussianIntegers, R 592
GaussianRationals, R 587
 Gaussians, *R* 592
Gcd, R 565
 Gcd and Lcm, *R* 565
Gcdex, R 129
GcdInt, R 128
GcdOp, R 565
GcdRepresentation, R 565
GcdRepresentationOp, R 566
 General Binary Relations, *R* 310
 General hash table definitions and operations, *N* 10
 General Hash Tables, *N* 10
GeneralisedEigenspaces, R 226
GeneralisedEigenvalues, R 226
 generalized characters, R 761
 Generalized Conjugation Technique, *E* 54
 generalized conjugation technique, *E* 54
GeneralizedEigenspaces, R 226
GeneralizedEigenvalues, R 226
GeneralLinearGroup, R 509
GeneralMappingByElements, R 300
 General Mappings, *R* 308
GeneralMappingsFamily, R 309
 General operations on transversals, *N* 16
GeneralOrthogonalGroup, R 510
GeneralUnitaryGroup, R 509
 Generating Fields, *R* 572
 Generating modules, *R* 568
 Generating Rings, *R* 556
GeneratingSetIsComplete, N 19
 generator, of the prime residue group, R 137
GeneratorsOfAdditiveGroup, R 554
GeneratorsOfAdditiveMagma, R 554
GeneratorsOfAdditiveMagmaWithZero, R 554
GeneratorsOfAlgebra, R 617
GeneratorsOfAlgebraModule, R 628
GeneratorsOfAlgebraWithOne, R 617
GeneratorsOfDivisionRing, R 573
GeneratorsOfDomain, R 288
GeneratorsOfEquivalenceRelationPartition,
 R 313
GeneratorsOfField, R 573
GeneratorsOfGroup, R 346
GeneratorsOfIdeal, R 559
GeneratorsOfLeftIdeal, R 560
GeneratorsOfLeftModule, R 568
GeneratorsOfLeftOperatorAdditiveGroup, R 568
GeneratorsOfLeftVectorSpace, R 594
GeneratorsOfMagma, R 318
GeneratorsOfMagmaWithInverses, R 318
GeneratorsOfMagmaWithOne, R 318
GeneratorsOfMonoid, R 540
GeneratorsOfNearAdditiveGroup, R 554
GeneratorsOfNearAdditiveMagma, R 554
GeneratorsOfNearAdditiveMagmaWithZero, R 554
GeneratorsOfPresentation, R 477
GeneratorsOfRightIdeal, R 560
GeneratorsOfRightModule, R 569
GeneratorsOfRightOperatorAdditiveGroup,
 R 569
GeneratorsOfRing, R 557
GeneratorsOfRingWithOne, R 561
GeneratorsOfRws, R 341
GeneratorsOfSemigroup, R 535
GeneratorsOfSomething, T 69
GeneratorsOfStruct, R 284
GeneratorsOfTwoSidedIdeal, R 559
GeneratorsOfVectorSpace, R 594
GeneratorsPrimeResidues, R 136

G

- GeneratorsSmallest, R 375
- GeneratorsSubgroupsTom, R 713
- GeneratorSyllable, R 332
- Generic Construction of Tables of Marks, *R* 717
- GetFusionMap, R 801
- GetHashEntry, N 10
- GetHashEntryAtLastIndex, N 12
- GetHashEntryIndex, N 11
- getter, of an attribute, T 72
- Get the Archives, *R* 825
- getting help, R 22
- GF, R 582
- GL, R 509
- GL and SL, *R* 426
- Global Memory Information, *R* 86
- Global Variables in the Library, *P* 31
- GModuleByMats, R 691
- GO, R 510
- GQuotients, R 389
- Grading, R 622
- Green's Relations, *R* 537
- GreensDClasses, R 538
- GreensDClassOfElement, R 538
- GreensHClasses, R 538
- GreensHClassOfElement, R 538
- GreensJClasses, R 538
- GreensJClassOfElement, R 538
- GreensLClasses, R 538
- GreensLClassOfElement, R 538
- GreensRClasses, R 538
- GreensRClassOfElement, R 538
- Groebner Bases, *R* 680
- GroebnerBasis, R 680
- GroebnerBasisNC, R 680
- Group, R 345
- group actions, R 393
 - operations syntax, R 392
- Group Actions - Name Changes, *R* 843
- group algebra, R 657
- Group Automorphisms, *R* 385
- GroupByRws, R 451
- GroupByRwsNC, R 451
- group characters, R 761
- Group Elements, *R* 345
- group general mapping, T 55
 - single-valued, T 55
 - total, T 55
- GroupGeneralMappingByImages, R 381
- GroupHClassOfGreensDClass, R 538
- GroupHomomorphismByFunction, R 381
- GroupHomomorphismByImages, R 380
- GroupHomomorphismByImagesNC, R 380
- GroupHomomorphismByImages vs. GroupGeneralMappingByImages, T 55
- Group Homomorphisms, Group Homomorphisms, by Images, *T* 54
- GroupOfPcgs, R 433
- group operations, R 393
- Group Properties, *R* 362
- GroupRing, R 658
- group ring, R 657
- Groups of Automorphisms, *R* 387
- GroupStabChain, R 420
- GroupWithGenerators, R 346
- GU, R 509

H

- h_N , R 158
- HallSubgroup, R 360
- HallSystem, R 361
 - for groups with pcgs, R 446
- Handling of Streams in the Background, *R* 105
- HasAbelianFactorGroup, R 368
- HasChainHomomorphicImage, N 20
- HasElementaryAbelianFactorGroup, R 368
- HashFunct, N 11
- HashKeyEnumerator, N 10
- Hash keys, N 11
- HasIndeterminateName, R 664
- HasParent, R 286
- HasseDiagramBinaryRelation, R 312
- HeadPcElementByNumber, R 435
- Help, *T* 25
- HELP_ADD_BOOK, E 42
- HenselBound, R 673
- hermite normal form, R 844
- HermiteNormalFormIntegerMat, R 238
- HermiteNormalFormIntegerMatTransform, R 238
- HeuristicCancelPolynomials, R 685
- HexStringInt, R 250
- HighestWeightModule, R 654
- History of Character Theory Stuff in GAP, *R* 720
- HMSMSec, R 255
- Hom, R 605
- HomCoset, N 14
- Hom coset chain subgroups, *N* 21

HomCosetWithImage, N 14
HomeEnumerator, R 404
Homomorphism, for quotient groups by homomorphisms, N 14
 for subgroup transversals, N 17
homomorphism, action, T 48
 natural, T 45
 operation, T 48
Homomorphism for very large groups, R 384
HomomorphismQuotientSemigroup, R 537
homomorphisms, find all, R 389
homomorphisms, Frobenius, field, R 583
Homomorphisms of Algebras, R 623
Homomorphisms vs. Factor Structures, T 83
Homomorphisms vs. General Mappings, T 83
HomomorphismTransformationSemigroup, R 536
HomTransversal, N 17
How to Implement New Kinds of Vector Spaces,
 R 607
HumanReadableDefinition, R 711

|

i_N, R 159
Ideal, R 558
IdealByGenerators, R 559
IdealNC, R 559
Ideals, R 615
Ideals in Rings, R 558
Ideals of semigroups, R 536
Idempotents, R 319
IdempotentsTom, R 704
IdempotentsTomInfo, R 704
Identical Lists, R 176, T 29
Identical Objects, R 110
Identical Records, R 259
IdentificationOfConjugacyClasses, R 726
Identifier, for character tables, R 732
 for tables of marks, R 705
identifier, T 22
Identifiers, R 42
Identity, R 288
IdentityBinaryRelation, R 310
IdentityFromSCTable, R 612
IdentityMapping, R 301
IdentityMat, R 223
IdentityTransformation, R 549
IdFunc, R 63
IdGap3SolvableGroup, R 516
IdGroup, R 516
IdSmallGroup, R 516
IdsOfAllSmallGroups, R 516
If, R 51
if statement, R 51
If Statements, T 41
If Things Go Wrong, R 830
Image, R 303
 for Frobenius automorphisms, R 583
image, vector under matrix, R 220
ImageElm, R 303
ImageElt, N 14
ImageGroup, N 18
ImageListOfTransformation, R 550
Images, R 303
ImagesElm, R 302
ImageSetOfTransformation, R 550
ImagesRepresentative, R 302
ImagesSet, R 302
ImagesSmallestGenerators, R 384
ImagesSource, N 15, R 302
Images under Mappings, R 302
ImfInvariants, R 529
ImfMatrixGroup, R 530
ImfNumberQClasses, R 527
ImfNumberQQClasses, R 527
ImfNumberZClasses, R 527
Immediate Methods, P 13
Immutability, T 30
Immutable, R 112
ImmutableBasis, R 601
ImmutableMatrix, R 232
Immutable Objects, T 80
Implementing New List Objects, P 23
in, for collections, R 272
 for lists, R 179
 for strictly sorted lists, R 192
 operation for, R 272
IndependentGeneratorsOfAbelianGroup, R 375
Indeterminate, R 663
IndeterminateName, R 664
Indeterminateness, R 809
IndeterminateNumberOfLaurentPolynomial,
 R 674
IndeterminateNumberOfUnivariateRational-
 Function, R 664
IndeterminateOfUnivariateRationalFunction,
 R 664

Indeterminates, *R 663*
IndeterminatesOfPolynomialRing, *R 675*
Index, *R 347*
indexing commands, *E 16*
IndexInWholeGroup, *R 347*
IndexNC, *R 347*
Index numbers of primitive groups, *R 524*
Indicator, *R 740*
IndicatorOp, *R 740*
IndicesCentralNormalSteps, *R 440*
IndicesChiefNormalSteps, *R 441*
IndicesEANormalSteps, *R 440*
IndicesInvoluntaryGenerators, *R 465*
IndicesNormalSteps, *R 442*
IndicesOfAdjointBasis, *R 618*
IndicesPCentralNormalStepsPGroup, *R 441*
IndicesStabChain, *R 420*
Indirected, *R 805*
Induced Actions, *R 693*
InducedAutomorphism, *R 388*
InducedClassFunction, *R 775*
InducedClassFunctions, *R 775*
InducedCyclic, *R 776*
InducedPcgs, *R 436*
InducedPcgsByGenerators, *R 436*
InducedPcgsByGeneratorsNC, *R 436*
InducedPcgsByPcSequence, *R 436*
InducedPcgsByPcSequenceAndGenerators, *R 437*
InducedPcgsByPcSequenceNC, *R 436*
InducedPcgsWrtFamilyPcgs, *R 449*
InducedPcgsWrtSpecialPcgs, *R 444*
Inequalities, *R 792*
inequality, of records, *R 260*
inequality test, *R 47*
InertiaSubgroup, *R 773*
Infinity, *R 157*
infinity, *R 157*
inflated class functions, *R 774*
Info, *R 79*
InfoAlgebra, *R 609*
InfoAttributes, *R 122*
InfoBckt, *R 422*
InfoCharacterTable, *R 725*
InfoCoh, *R 377*
InfoComplement, *R 358*
InfoCoset, *R 355*
InfoFpGroup, *R 459*
Info Functions, *R 79*
InfoGroebner, *R 681*
InfoGroup, *R 346*
InfoLattice, *R 372*
InfoLevel, *R 79*
InfoMatrix, *R 218*
InfoMonomial, *R 817*
InfoNumtheor, *R 135*
InfoOptions, *R 88*
InfoPcSubgroup, *R 375*
Information about a function, *R 61*
Information about the version used, *R 83*
InfoText, *R 733*
InfoTom, *R 702*
InfoWarning, *R 80*
init.g, for a GAP package, *E 38*
InitFusion, *R 814*
InitPowerMap, *R 812*
Injection, *N 18*
InjectionZeroMagma, *R 317*
InnerAutomorphism, *R 386*
InnerAutomorphismNC, *R 386*
InnerAutomorphismsAutomorphismGroup, *R 387*
inner product, of group characters, *R 771*
In Parent Attributes, *E 47*
InParentFOA, *E 48*
Input-Output Streams, *R 104*
InputLogTo, *R 94*
 for streams, *R 101*
 stop logging input, *R 94*
InputOutputLocalProcess, *R 104*
InputTextFile, *R 102*
InputTextNone, *R 105*
InputTextString, *R 103*
InputTextUser, *R 103*
InsertTrivialStabilizer, *R 421*
InstallAtExit, *R 73*
installation, *R 824*
Installation of GAP for Mac OS, *R 835*
Installation of GAP Package Binaries, *E 38*
Installation Overview, *R 824*
InstallCharReadHookFunc, *R 105*
InstalledPackageVersion, *R 841*
InstallFactorMaintenance, *R 294*
InstallFlushableValue, *P 32*
InstallGlobalFunction, *P 32*
InstallHandlingByNiceBasis, *R 607*
InstallImmediateMethod, *P 14*
Installing a GAP Package, *R 839*

Installing a Help Book, *E 42*
InstallIsomorphismMaintenance, R 294
InstallMethod, P 11
InstallOtherMethod, P 12
InstallSubsetMaintenance, R 294
InstallTrueMethod, P 14
InstallValue, P 32
Int, R 126

- for cyclotomics, R 155
- for strings, R 253

INT_CHAR, R 253
integer part of a quotient, R 128
Integers, R 125
Integral Bases of Abelian Number Fields, *R 589*
IntegralizedMat, R 241
IntegratedStraightLineProgram, R 337
IntermediateGroup, R 367
IntermediateResultOfSLP, R 338
IntermediateResultOfSLPWithoutOverwrite,
R 338
IntermediateResultsOfSLPWithoutOverwrite,
R 338
IntermediateSubgroups, R 367
Internally Represented Cyclotomics, *R 163*
Internally Represented Strings, *R 248*
InterpolatedPolynomial, R 567
IntersectBlist, R 208
Intersection, R 270

- for groups with pcgs, R 446

intersection, of collections, R 270

- of sets, R 193

Intersection2, R 270
IntersectionBlist, R 207
IntersectionsTom, R 709
IntersectSet, R 193
IntFFE, R 581
IntFFESymm, R 581
IntHexString, R 253
Introducing new Viewer for the Online Help, *E 45*
IntScalarProducts, R 810
IntVecFFE, R 581
InvariantBilinearForm, R 427
InvariantElementaryAbelianSeries, R 366
Invariant Forms, *R 427*
InvariantLattice, R 429
InvariantQuadraticForm, R 427
InvariantSesquilinearForm, R 427
InvariantSubgroupsElementaryAbelianGroup,
R 373
Inverse, R 290
inverse, group homomorphism, R 382

- matrix, R 220
- of class function, R 766

InverseAttr, R 290
InverseClasses, R 733
InverseGeneralMapping, R 300
InverseImmutable, R 290
InverseMap, R 805
InverseMatMod, R 234
InverseMutable, R 290
InverseOp, R 290
InverseRepresentative, R 420
InverseSameMutability, R 290
InverseSM, R 290
Invoking the Help, *R 22*
Irr, R 728
irrationalities, R 154
IrrBaumClausen, R 745
IrrConlon, R 745
IrrDixonSchneider, R 745
Irreducibility Tests, *R 692*
irreducible character, R 770
irreducible characters, computation, R 748
IrreducibleDifferences, R 777
Irreducible Maximal Finite Integral Matrix Groups,
R 526
IrreducibleModules, R 747

- for groups with pcgs, R 446

IrreducibleRepresentations, R 746
IrreducibleRepresentationsDixon, R 747
IrreducibleSolvableGroup, R 525
IrreducibleSolvableGroupMS, R 525
Irreducible Solvable Matrix Groups, *R 525*
Is16BitsFamily, R 333
Is32BitsFamily, R 333
Is8BitsFamily, R 333
IsAbelian, R 319

- for character tables, R 730

IsAbelianNumberField, R 588
IsAbelianNumberFieldPolynomialRing, R 676
IsAbelianTom, R 706
IsAdditiveElement, R 295
IsAdditiveElementWithInverse, R 295
IsAdditiveElementWithZero, R 295
IsAdditiveGroup, R 553

IsAdditiveGroupGeneralMapping, R 307
IsAdditiveGroupHomomorphism, R 307
IsAdditivelyCommutative, R 554
IsAdditivelyCommutativeElement, R 297
IsAdditivelyCommutativeElementCollColl,
 R 297
IsAdditivelyCommutativeElementCollection,
 R 297
IsAdditivelyCommutativeElementFamily, R 297
IsAdditiveMagma, R 552
IsAdditiveMagmaWithInverses, R 553
IsAdditiveMagmaWithZero, R 552
IsAlgebra, R 616
IsAlgebraGeneralMapping, R 308
IsAlgebraHomomorphism, R 308
IsAlgebraicElement, R 687
IsAlgebraicExtension, R 686
IsAlgebraModuleElement, R 628
IsAlgebraModuleElementCollection, R 628
IsAlgebraModuleElementFamily, R 628
IsAlgebraWithOne, R 616
IsAlgebraWithOneGeneralMapping, R 308
IsAlgebraWithOneHomomorphism, R 308
IsAlphaChar, R 249
IsAlternatingGroup, R 413
IsAnticommutative, R 562
IsAntisymmetricBinaryRelation, R 311
IsAssociated, R 563
IsAssociative, R 319
IsAssociativeElement, R 297
IsAssociativeElementCollColl, R 297
IsAssociativeElementCollection, R 297
IsAssocWord, R 326
IsAssocWordWithInverse, R 326
IsAssocWordWithOne, R 326
IsAttributeStoringRep, P 37
IsAutomorphismGroup, R 387
IsBasicWreathLessThanOrEqual, R 329
IsBasicWreathProductOrdering, R 281
IsBasis, R 596
IsBasisByNiceBasis, R 607
IsBasisOfAlgebraModuleElementSpace, R 629
IsBergerCondition, R 818
IsBijection, T 79
IsBijective, R 302
IsBinaryRelation, R 310
 same as **IsEndoGeneralMapping**, R 310
IsBLetterAssocWordRep, R 333
IsBLetterWordsFamily, R 333
IsBlist, R 206
IsBlockMatrixRep, R 235
IsBool, R 166
IsBound, for lists, R 175
IsBound and Unbind for Lists, R 175
IsBound and Unbind for Records, R 261
IsBoundElmWPObj, E 52
IsBoundGlobal, R 45
IsBrauerTable, R 724
IsBravaisGroup, R 429
IsBuiltFromAdditiveMagmaWithInverses, R 342
IsBuiltFromGroup, R 342
IsBuiltFromMagma, R 342
IsBuiltFromMagmaWithInverses, R 342
IsBuiltFromMagmaWithOne, R 342
IsBuiltFromSemigroup, R 342
IsCanonicalBasis, R 599
IsCanonicalBasisFullMatrixModule, R 603
IsCanonicalBasisFullRowModule, R 603
IsCanonicalNiceMonomorphism, R 385
IsCanonicalPcgs, R 437
IsCentral, R 319
IsChainTypeGroup, N 19
IsChar, R 245
IsCharacter, R 770
IsCharacteristicSubgroup, R 348
IsCharacterTable, R 724
IsCharacterTableInProgress, R 724
IsCharCollection, R 245
IsCheapConwayPolynomial, R 584
IsClassFunction, R 761
IsClassFusionOfNormalSubgroup, R 739
IsClosedStream, R 96
IsCochain, R 650
IsCochainCollection, R 650
IsCollection, R 263
IsCollectionFamily, R 263
IsCommutative, R 319
IsCommutativeElement, R 297
IsCommutativeElementCollColl, R 297
IsCommutativeElementCollection, R 297
IsComponentObjectRep, P 38
IsCompositionMappingRep, R 300
IsConfluent, R 340
 for pc groups, R 451
IsConjugacyClassSubgroupsByStabilizerRep,
 R 369

IsConjugacyClassSubgroupsRep, R 369
IsConjugate, R 357
IsConjugatorAutomorphism, R 386
IsConjugatorIsomorphism, R 386
IsConstantRationalFunction, R 668
IsConstantTimeAccessGeneralMapping, R 308
IsConstantTimeAccessList, R 170
IsContainedInSpan, R 601
IsCopyable, R 112
IsCyc, R 155
IsCyclic, R 362
 for character tables, R 730
IsCyclicTom, R 706
IsCyclotomic, R 155
IsCyclotomicField, R 588
IsCyclotomicMatrixGroup, R 428
IsDenseList, R 169
IsDiagonalMat, R 222
IsDictionary, N 9
IsDigitChar, R 249
IsDirectoryPath, R 92
IsDistributive, R 562
IsDivisionRing, R 572
IsDomain, R 287
IsDoneIterator, R 274
IsDoubleCoset, R 355
IsDuplicateFree, R 190
IsDuplicateFreeList, R 190
IsDxLargeGroup, R 749
IsElementaryAbelian, R 362
 for character tables, R 730
IsElementOfFpMonoid, R 544
IsElementOfFpSemigroup, R 544
IsElementOfFreeMagmaRing, R 659
IsElementOfFreeMagmaRingCollection, R 659
IsElementOfFreeMagmaRingFamily, R 659
IsElementOfMagmaRingModuloRelations, R 660
IsElementOfMagmaRingModuloRelations-
 Collection, R 660
IsElementOfMagmaRingModuloRelationsFamily,
 R 660
IsElementOfMagmaRingModuloSpanOfZeroFamily,
 R 661
IsEmpty, R 268
IsEmptyString, R 248
IsEndOfStream, R 99
IsEndoGeneralMapping, R 308
 same as **IsBinaryRelation**, R 310

IsEqualSet, R 192
IsEquivalenceClass, R 314
IsEquivalenceRelation, R 311
IsEuclideanRing, R 564
IsEvenInt, R 126
IsExecutableFile, R 92
IsExistingFile, R 92
IsExtAElement, R 295
IsExternalOrbit, R 405
IsExternalSet, R 404
IsExternalSubset, R 405
IsExtLElement, R 295
IsExtRElement, R 295
IsFamilyPcgs, R 449
IsFFE, R 578
IsFFECollColl, R 578
IsFFECollection, R 578
IsField, R 572
IsFieldControlledByGaloisGroup, R 575
IsFieldHomomorphism, R 308
IsFinite, R 268
 for character tables, R 730
IsFiniteDimensional, R 570
 for matrix algebras, R 617
IsFiniteFieldPolynomialRing, R 676
IsFinitelyGeneratedGroup, R 363
IsFiniteOrderElement, R 297
IsFiniteOrderElementCollColl, R 297
IsFiniteOrderElementCollection, R 297
IsFiniteOrdersPcgs, R 433
IsFixedStabilizer, R 422
IsFLMLOR, R 616
IsFLMLORWithOne, R 616
IsFpGroup, R 459
IsFpMonoid, R 544
IsFpSemigroup, R 544
IsFreeGroup, R 327
IsFreeLeftModule, R 570
IsFreeMagmaRing, R 658
IsFreeMagmaRingWithOne, R 658
IsFromFpGroupGeneralMappingByImages, R 391
IsFromFpGroupHomomorphismByImages, R 391
IsFromFpGroupStdGensGeneralMappingByImages,
 R 391
IsFromFpGroupStdGensHomomorphismByImages,
 R 391
IsFullHomModule, R 606
IsFullMatrixModule, R 571

`IsFullRowModule`, R 571
`IsFullSubgroupGLorSLRespectingBilinearForm`,
 R 427
`IsFullSubgroupGLorSLRespectingQuadratic-`
 `Form`, R 428
`IsFullSubgroupGLorSLRespectingSesquilinear-`
 `Form`, R 427
`IsFullTransformationSemigroup`, R 536
`IsFunc`, T 79
`IsFunction`, R 63
`IsGaussianIntegers`, R 592
`IsGaussianRationals`, R 587
`IsGaussianSpace`, R 601
`IsGaussInt`, R 157
`IsGaussRat`, R 157
`IsGeneralizedDomain`, R 287
`IsGeneralizedRowVector`, R 181
`IsGeneralLinearGroup`, R 426
`IsGeneralMapping`, R 308
`IsGeneralMappingFamily`, R 309
`IsGeneratorsOfStruct`, R 284
`IsGL`, R 426
`IsGreensLessThanOrEqual`, R 537
`IsGroup`, R 346
`IsGroupGeneralMapping`, R 306
`IsGroupGeneralMappingByAsGroupGeneral-`
 `MappingByImages`, R 391
`IsGroupGeneralMappingByImages`, R 391
`IsGroupGeneralMappingByPcgs`, R 391
`IsGroupHClass`, R 538
`IsGroupHomomorphism`, R 306
`IsGroupOfAutomorphisms`, R 387
`IsGroupRing`, R 658
`IsHandledByNiceBasis`, R 571
 for vector spaces, R 607
`IsHandledByNiceMonomorphism`, R 385
`IsHash`, N 10
`IsHasseDiagram`, R 311
`IsHomCoset`, N 13
`IsHomCosetOfAdditiveElt`, N 14
`IsHomCosetOfFp`, N 14
`IsHomCosetOfMatrix`, N 14
`IsHomCosetOfPerm`, N 14
`IsHomCosetOfTuple`, N 14
`IsHomCosetToAdditiveElt`, N 13
`IsHomCosetToAdditiveEltRep`, N 13
`IsHomCosetToFp`, N 13
`IsHomCosetToFpRep`, N 13
`IsHomCosetToMatrix`, N 13
`IsHomCosetToMatrixRep`, N 13
`IsHomCosetToObjectRep`, N 13
`IsHomCosetToPerm`, N 13
`IsHomCosetToPermRep`, N 13
`IsHomCosetToTuple`, N 13
`IsHomCosetToTupleRep`, N 13
`IsHomogeneousList`, R 170
`IsIdempotent`, R 290
`IsIdenticalObj`, R 110, T 24
`IsInChain`, N 19
`IsIncomparableUnder`, R 277
`IsInducedFromNormalSubgroup`, R 820
`IsInducedPcgs`, R 436
`IsInducedPcgsWrtSpecialPcgs`, R 444
`IsInfBitsFamily`, R 333
`IsInfinity`, R 157
`IsInjective`, R 302
`IsInnerAutomorphism`, R 386
`IsInputOutputStream`, R 104
`IsInputStream`, R 96
`IsInputTextNone`, R 96
`IsInputTextStream`, R 96
`IsInt`, R 126
`IsIntegerMatrixGroup`, R 429
`IsIntegers`, R 125
`IsIntegralBasis`, R 599
`IsIntegralCyclotomic`, R 155
`IsIntegralRing`, R 561
`IsInternallyConsistent`, R 114
 for character tables, R 739
 for tables of marks, R 707
`IsIrreducibleCharacter`, R 770
`IsIrreducibleRingElement`, R 563
`IsIterator`, R 274
`IsJacobianElement`, R 297
`IsJacobianElementCollColl`, R 297
`IsJacobianElementCollection`, R 297
`IsJacobianRing`, R 562
`IsLaurentPolynomial`, R 667
`IsLaurentPolynomialDefaultRep`, R 683
`IsLDistributive`, R 562
`IsLeftAlgebraModuleElement`, R 628
`IsLeftAlgebraModuleElementCollection`, R 628
`IsLeftIdeal`, R 559
`IsLeftIdealInParent`, R 559
`IsLeftModule`, R 568
`IsLeftModuleGeneralMapping`, R 307

IsLeftModuleHomomorphism, R 307
IsLeftOperatorAdditiveGroup, R 568
IsLeftSemigroupIdeal, R 536
IsLeftVectorSpace, R 593
IsLessThanOrEqualUnder, R 277
IsLessThanUnder, R 277
IsLetterAssocWordRep, R 332
IsLetterWordsFamily, R 332
IsLexicographicallyLess, R 196
IsLexOrderedFFE, R 579
IsLieAbelian, R 639
IsLieAlgebra, R 616
IsLieMatrix, R 219
IsLieNilpotent, R 639
IsLieObject, R 634
IsLieObjectCollection, R 634
IsLieSolvable, R 639
IsLinearMapping, R 307
IsLinearMappingsModule, R 606
IsList, R 169
IsListDefault, R 181
IsListOrCollection, R 264
IsLogOrderedFFE, R 579
IsLookupDictionary, N 9
IsLowerAlphaChar, R 249
IsLowerTriangularMat, R 222
IsMagma, R 315
IsMagmaHomomorphism, R 305
IsMagmaRingModuloRelations, R 660
IsMagmaRingModuloSpanOfZero, R 661
IsMagmaWithInverses, R 315
IsMagmaWithInversesIfNonzero, R 315
IsMagmaWithOne, R 315
IsMapping, R 301
IsMat, T 79
IsMatchingSublist, R 189
IsMatrix, R 218
IsMatrixGroup, R 425
IsMatrixModule, R 571
IsMatrixSpace, R 601
IsMinimalNonmonomial, R 823
IsModuloPcgs, R 438
IsMonoid, R 540
IsMonomial, for characters, R 820
 for character tables, R 730
 for groups, R 820
 for positive integers, R 821
IsMonomialGroup, R 362
IsMonomialMatrix, R 222
IsMonomialNumber, R 821
IsMonomialOrdering, R 677
IsMultiplicativeElement, R 295
IsMultiplicativeElementWithInverse, R 296
IsMultiplicativeElementWithOne, R 296
IsMultiplicativeElementWithZero, R 296
IsMultiplicativeGeneralizedRowVector, R 181
IsMultiplicativeZero, R 319
IsMutable, R 112
IsMutableBasis, R 600
IsNaturalAlternatingGroup, R 412
IsNaturalGL, R 427
IsNaturalGLnZ, R 429
IsNaturalSL, R 427
IsNaturalSLnZ, R 429
IsNaturalSymmetricGroup, R 412
IsNearAdditiveElement, R 295
IsNearAdditiveElementWithInverse, R 295
IsNearAdditiveElementWithZero, R 295
IsNearAdditiveGroup, R 552
IsNearAdditiveMagma, R 552
IsNearAdditiveMagmaWithInverses, R 552
IsNearAdditiveMagmaWithZero, R 552
IsNearlyCharacterTable, R 724
IsNearRingElement, R 296
IsNearRingElementWithInverse, R 296
IsNearRingElementWithOne, R 296
IsNegRat, R 143
IsNilpotent, for character tables, R 730
 for groups with pcgs, R 446
IsNilpotentElement, R 646
IsNilpotentGroup, R 362
IsNilpotentTom, R 706
IsNonassocWord, R 322
IsNonassocWordCollection, R 322
IsNonassocWordWithOne, R 322
IsNonassocWordWithOneCollection, R 322
IsNonnegativeIntegers, R 125
IsNonSPGeneralMapping, R 309
IsNonTrivial, R 268
IsNormal, R 347
IsNormalBasis, R 599
IsNotIdenticalObj, R 111
IsNumberField, R 588
IsObject, R 109
IsOddInt, R 126
 isomorphic, pc group, R 452

IsomorphicSubgroups, R 389
IsomorphismFpAlgebra, R 625
IsomorphismFpGroup, R 468
 for subgroups of fp groups, R 470
IsomorphismFpGroupByGenerators, R 468
IsomorphismFpGroupByGeneratorsNC, R 468
IsomorphismFpGroupByPcgs, R 450
IsomorphismFpSemigroup, R 545
IsomorphismGroups, R 389
IsomorphismMatrixAlgebra, R 625
IsomorphismPcGroup, R 453
IsomorphismPermGroup, R 412
 for Imf matrix groups, R 532
IsomorphismPermGroupImfGroup, R 533
IsomorphismReesMatrixSemigroup, R 539
IsomorphismRefinedPcGroup, R 452
IsomorphismRepStruct, R 285
isomorphisms, find all, R 389
IsomorphismSCAlgebra, R 626
IsomorphismSimplifiedFpGroup, R 471
IsomorphismSpecialPcGroup, R 453
Isomorphisms vs. Isomorphic Structures, *T 84*
IsomorphismTransformationSemigroup, R 536
IsomorphismTypeInfoFiniteSimpleGroup, R 363
IsOne, R 290
IsOperation, R 63
IsOrdering, R 276
IsOrderingOnFamilyOfAssocWords, R 278
IsOrdinaryMatrix, R 218
IsOrdinaryTable, R 724
IsOutputStream, R 97
IsOutputTextNone, R 97
IsOutputTextStream, R 97
IsPadicExtensionNumber, R 690
IsPadicExtensionNumberFamily, R 690
IsParentPcgsFamilyPcgs, R 449
IsPartialOrderBinaryRelation, R 311
IsPcGroup, R 450
IsPcGroupGeneralMappingByImages, R 391
IsPcGroupHomomorphismByImages, R 391
IsPcgs, R 432
IsPcgsCentralSeries, R 440
IsPcgsChiefSeries, R 441
IsPcgsElementaryAbelianSeries, R 440
IsPcgsPCentralSeriesPGroup, R 441
IsPerfect, for character tables, R 730
IsPerfectGroup, R 362
IsPerfectTom, R 706
IsPerm, R 407
IsPermCollColl, R 407
IsPermCollection, R 407
IsPermGroup, R 411
IsPermGroupGeneralMappingByImages, R 391
IsPermGroupHomomorphismByImages, R 391
IsPGGroup, R 363
IsPNilpotent, R 364
IsPolycyclicGroup, R 362
IsPolynomial, R 667
IsPolynomialDefaultRep, R 683
IsPolynomialFunction, R 666
IsPolynomialFunctionsFamily, R 681
IsPolynomialRing, R 676
IsPosInt, R 126
IsPositiveIntegers, R 125
IsPosRat, R 143
IsPreimagesByAsGroupGeneralMappingByImages, R 391
IsPreOrderBinaryRelation, R 311
IsPrime, R 563
IsPrimeField, R 574
IsPrimeInt, R 130
IsPrimeOrdersPcgs, R 433
IsPrimePowerInt, R 131
IsPrimitive, R 403
IsPrimitiveCharacter, R 819
IsPrimitivePolynomial, R 668
IsPrimitiveRootMod, R 137
IsProbablyPrimeInt, R 130
IsPseudoCanonicalBasisFullHomModule, R 606
IsPSolvable, R 364
IsPSolvableCharacterTable, R 739
IsPSolvableCharacterTableOp, R 739
IsPurePadicNumber, R 689
IsPurePadicNumberFamily, R 689
IsQuasiPrimitive, R 819
IsQuaternion, R 617
IsQuaternionCollColl, R 617
IsQuaternionCollection, R 617
IsQuickPositionList, R 204
IsQuotientSemigroup, R 537
IsRange, R 203
IsRat, R 142
IsRationalFunction, R 666
IsRationalFunctionDefaultRep, R 683
IsRationalFunctionsFamily, R 681
IsRationalMatrixGroup, R 428

IsRationals, R 142
IsRationalsPolynomialRing, R 676
IsRDistributive, R 562
IsReadableFile, R 92
IsReadOnlyGlobal, R 44
IsRec, T 79
IsRecord, R 257
IsRecordCollColl, R 257
IsRecordCollection, R 257
IsReduced, R 341
IsReductionOrdering, R 278
IsReesCongruence, R 537
IsReesCongruenceSemigroup, R 536
IsReesMatrixSemigroup, R 539
IsReesMatrixSemigroupElement, R 539
IsReesZeroMatrixSemigroup, R 539
IsReesZeroMatrixSemigroupElement, R 539
IsReflexiveBinaryRelation, R 310
IsRegular, R 402
IsRegularDClass, R 538
IsRegularSemigroup, R 535
IsRegularSemigroupElement, R 535
IsRelativelySM, R 822
IsRestrictedLieAlgebra, R 644
IsRewritingSystem, R 340
IsRightAlgebraModuleElement, R 628
IsRightAlgebraModuleElementCollection, R 628
IsRightCoset, R 353
IsRightIdeal, R 559
IsRightIdealInParent, R 559
IsRightModule, R 569
IsRightOperatorAdditiveGroup, R 568
IsRightSemigroupIdeal, R 536
IsRing, R 556
IsRingElement, R 296
IsRingElementWithInverse, R 296
IsRingElementWithOne, R 296
IsRingGeneralMapping, R 308
IsRingHomomorphism, R 308
IsRingWithOne, R 560
IsRingWithOneGeneralMapping, R 308
IsRingWithOneHomomorphism, R 308
IsRootSystem, R 641
IsRootSystemFromLieAlgebra, R 641
IsRowModule, R 571
IsRowSpace, R 601
IsRowVector, R 210
IsScalar, R 296
IsSemiEchelonized, R 602
IsSemigroup, R 534
IsSemigroupCongruence, R 537
IsSemigroupIdeal, R 536
IsSemiRegular, R 402
IsSet, R 190, T 79
IsShortLexLessThanOrEqual, R 329
IsShortLexOrdering, R 279
IsSimple, for character tables, R 730
IsSimpleAlgebra, R 617
IsSimpleGroup, R 362
IsSimpleSemigroup, R 535
IsSingleValued, R 301
IsSL, R 427
IsSolvable, for character tables, R 730
IsSolvableGroup, R 362
IsSolvableTom, R 706
IsSortedList, R 190
IsSpecialLinearGroup, R 427
IsSpecialPcgs, R 443
IsSPGeneralMapping, R 309
IsSporadicSimple, for character tables, R 730
IsSSortedList, R 190
IsStandardGeneratorsOfGroup, R 712
IsStraightLineProgElm, R 338
IsStraightLineProgram, R 334
IsStream, R 96
IsString, R 245
IsStringRep, R 248
IsStruct, R 285
IsSubgroup, R 347
IsSubgroupFpGroup, R 459
IsSubgroupOfWholeGroupByQuotientRep, R 472
IsSubgroupSL, R 427
IsSubmonoidFpMonoid, R 543
IsSubnormal, R 348
IsSubnormallyMonomial, R 822
IsSubsemigroupFpSemigroup, R 543
IsSubset, R 270
IsSubsetBlist, R 207
IsSubsetLocallyFiniteGroup, R 363
IsSubsetSet, R 193
IsSubspacesVectorSpace, R 595
IsSubstruct, R 287
IsSupersolvable, for character tables, R 730
 for groups with pcgs, R 446
IsSupersolvableGroup, R 362
IsSurjective, R 302

I
 IsSyllableAssocWordRep, R 333
 IsSyllableWordsFamily, R 333
 IsSymmetricBinaryRelation, R 311
 IsSymmetricGroup, R 413
 IsTable, R 170
 IsTableOfMarks, R 702
 IsTableOfMarksWithGens, R 713
 IsToPcGroupGeneralMappingByImages, R 391
 IsToPcGroupHomomorphismByImages, R 391
 IsToPermGroupGeneralMappingByImages, R 391
 IsToPermGroupHomomorphismByImages, R 391
 IsTotal, R 301
 IsTotalOrdering, R 277
 IsTransformation, R 549
 IsTransformationCollection, R 549
 IsTransformationMonoid, R 536
 IsTransformationSemigroup, R 536
 IsTransitive, for characters, R 773
 for class functions, R 773
 for group actions, R 402
 IsTransitiveBinaryRelation, R 311
 IsTranslationInvariantOrdering, R 278
 IsTrivial, R 268
 IsTuple, R 299
 IsTwoSidedIdeal, R 559
 IsTwoSidedIdealInParent, R 559
 IsUEALatticeElement, R 653
 IsUEALatticeElementCollection, R 653
 IsUEALatticeElementFamily, R 653
 IsUniqueFactorizationRing, R 561
 IsUnit, R 562
 IsUnivariatePolynomial, R 667
 IsUnivariatePolynomialRing, R 677
 IsUnivariateRationalFunction, R 667
 IsUnknown, R 164
 IsUpperAlphaChar, R 249
 IsUpperTriangularMat, R 222
 IsValidIdentifier, R 42
 IsVector, R 296
 IsVectorSpace, R 593
 IsVirtualCharacter, R 770
 IsWeightLexOrdering, R 280
 IsWeightRepElement, R 654
 IsWeightRepElementCollection, R 654
 IsWeightRepElementFamily, R 654
 IsWellFoundedOrdering, R 277
 IsWeylGroup, R 642
 IsWholeFamily, R 269

IsWLetterAssocWordRep, R 333
 IsWLetterWordsFamily, R 333
 IsWord, R 321
 IsWordCollection, R 322
 IsWordWithInverse, R 321
 IsWordWithOne, R 321
 IsWreathProductOrdering, R 281
 IsWritableFile, R 92
 IsZero, R 290
 IsZeroGroup, R 536
 IsZeroSimpleSemigroup, R 535
 IsZeroSquaredElement, R 298
 IsZeroSquaredElementCollColl, R 298
 IsZeroSquaredElementCollection, R 298
 IsZeroSquaredRing, R 562
 IsZmodnZObj, R 134
 IsZmodnZObjNonprime, R 134
 IsZmodpZObj, R 134
 IsZmodpZObjLarge, R 134
 IsZmodpZObjSmall, R 134
 Iterated, R 201
 Iterator, R 273
 iterator, for low index subgroups, R 467
 IteratorByBasis, R 598
 IteratorByFunctions, R 275
 IteratorList, R 275
 Iterators, R 273
 IteratorSorted, R 274

J

j_N , R 159
 Jacobi, R 137
 JenningsLieAlgebra, R 645
 JenningsSeries, R 367
 JoinEquivalenceRelations, R 313
 JoinStringsWithSeparator, R 251
 JordanDecomposition, R 231

K

k_N , R 159
 KappaPerp, R 646
 KBREW, R 547
 kernel, T 55
 KernelOfAdditiveGeneralMapping, R 307
 KernelOfCharacter, R 772
 KernelOfMultiplicativeGeneralMapping, R 306
 KernelOfTransformation, R 550
 KeyDependentOperation, E 46
 Key Dependent Operations, E 46

Keywords, *R* 41
KillingMatrix, R 646
KnownAttributesOfObject, R 120, T 75
 Known Problems of the Configure Process, *R* 831
KnownPropertiesOfObject, R 123, T 75
KnownTruePropertiesOfObject, R 123, T 75
KnowsDictionary, N 9
KnowsHowToDecompose, R 379
KnuthBendixRewritingSystem, R 548
 Krasner-Kaloujnine theorem, R 504
KroneckerProduct, R 224
KuKGenerators, R 504
L
 l_N , R 159
 Labels and References, *E* 15
Lambda, R 135
 Language Overview, *R* 39
 larger or equal, R 47
 larger test, R 47
LargestElementGroup, R 375
LargestElementStabChain, R 420
LargestMovedPoint, R 408
LargestUnknown, R 164
 last, R 64, T 24
 last2, T 24
 last3, T 24
LastSystemError, R 89
LaTeXStringDecompositionMatrix, R 737
 lattice base reduction, R 241
 lattice basis reduction, for virtual characters, R 777
LatticeByCyclicExtension, R 372
LatticeGeneratorsInUEA, R 653
 Lattice Reduction, *R* 241
LatticeSubgroups, R 370
LatticeSubgroupsByTom, R 700
LaurentPolynomialByCoefficients, R 674
LaurentPolynomialByExtRep, R 684
LaurentPolynomialByExtRepNC, R 684
 Laurent Polynomials, *R* 674
LClassOfHClass, R 537
Lcm, R 566
LcmInt, R 129
LcmOp, R 566
LeadCoeffsIGS, R 437
LeadingCoefficient, R 669
LeadingCoefficientOfPolynomial, R 678
LeadingExponentOfPcElement, R 434
LeadingMonomial, R 670
LeadingMonomialOfPolynomial, R 677
LeadingTermOfPolynomial, R 677
 Leaving GAP, *R* 73
 leaving GAP, T 18
LeftActingAlgebra, R 629
LeftActingDomain, R 569
LeftActingRingOfIdeal, R 560
LeftAlgebraModule, R 627
LeftAlgebraModuleByGenerators, R 627
 left cosets, R 353
LeftDerivations, R 636
LeftIdeal, R 558
LeftIdealByGenerators, R 559
LeftIdealNC, R 559
LeftModuleByGenerators, R 569
LeftModuleByHomomorphismToMatAlg, R 630
LeftModuleGeneralMappingByImages, R 604
LeftModuleHomomorphismByImages, R 604
LeftModuleHomomorphismByImagesNC, R 604
LeftModuleHomomorphismByMatrix, R 605
LeftQuotient, R 292
 for words, R 330
LeftShiftRowVector, R 214
 legacy, R 843
Legendre, R 138
Length, R 190
 of an associative word, R 330
 length, of a word, R 330
LengthsTom, R 703
LengthWord, T 79
LengthWPObj, E 52
LenstraBase, R 590
LessThanFunction, R 277
LessThanOrEqualFunction, R 277
LetterRepAssocWord, R 333
LevelsOfGenerators, R 281
LeviMalcevDecomposition, R 622
 for Lie algebras, R 640
 Lexical Structure, *R* 40
LexicographicOrdering, R 278
LGFIRST, R 444
LGLayers, R 444
LGLength, R 444
LGWeights, R 443
 library tables, R 721
LieAlgebra, R 635
LieAlgebraByStructureConstants, R 635

LieBracket, R 292
LieCenter, R 637
LieCentralizer, R 637
LieCentre, R 637
LieCoboundaryOperator, R 650
LieDerivedSeries, R 638
LieDerivedSubalgebra, R 638
LieFamily, R 635
LieLowerCentralSeries, R 639
LieNilRadical, R 638
LieNormalizer, R 637
LieObject, R 634
Lie objects, *R 634*
LieSolvableRadical, R 638
LieUpperCentralSeries, R 639
LiftedInducedPcgs, R 439
LiftedPcElement, R 439
LinearAction, R 445
LinearActionLayer, R 445
LinearCharacters, R 729
LinearCombination, R 598
LinearCombinationPcgs, R 434
Linear equations over the integers and Integral Matrices, *R 236*
LinearIndependentColumns, R 241
Linear Mappings, *R 307*
LinearOperation, R 445
LinearOperationLayer, R 445
Line Editing, *R 73*
line editing, T 20
LinesOfStraightLineProgram, R 335
List, R 198
list and non-list, difference, R 183
 left quotient, R 185
 mod, R 185
 product, R 184
 quotient, R 185
List Assignment, *R 173*
list assignment, operation, R 171
ListBlist, R 207
list boundedness test, operation, R 171
List Categories, *R 169*
list element, access, R 171
 assignment, R 173
 operation, R 171
List Elements, *R 171*
list environment, compact description, E 21
 description, E 20
 ordered, E 21
 unordered, E 21
list equal, comparison, R 179
ListN, R 201
list of available books, R 23
List Operations, *T 35*
ListPerm, R 410
lists, dense, T 29
 strictly sorted, T 31
lists, identical, *T 29*
 plain, *T 27*
Lists and Collections, *R 264*
list smaller, comparison, R 180
ListStabChain, R 420
list unbind, operation, R 171
ListWithIdenticalEntries, R 186
ListX, R 201
LLL, R 777
LLL algorithm, for Gram matrices, R 242
 for vectors, R 241
 for virtual characters, R 777
LLLReducedBasis, R 241
LLLReducedGramMat, R 242
LoadDynamicModule, R 35
Loading a GAP Package, *R 839*
loading a saved workspace, R 37
loading source code from a file, T 19
LoadPackage, R 839
local, R 55
Local Variables, *T 41*
logarithm, discrete, R 137
 of a root of unity, R 157
LogFFE, R 580
logical, R 166
Logical Implications, *P 14*
logical operations, R 167
LogInt, R 127
LogMod, R 136
LogModShanks, R 136
LogTo, R 94
 for streams, R 101
 stop logging, R 94
LongestWeylWordPerm, R 643
LookupDictionary, N 9
loop, read eval print, R 64
loop, **for**, R 53
 repeat, R 52
 while, R 52

loop over iterator, R 54
 loop over object, R 54
 loop over range, R 53
 loops, leaving, R 55
 restarting, R 55
 loops, `for`, T 33
 `while`, T 33
`LowercaseString`, R 250
`LowerCentralSeriesOfGroup`, R 366
 Low Index Subgroups, *R* 467
`LowIndexSubgroupsFpGroup`, R 467
`LowIndexSubgroupsFpGroupIterator`, R 467
 Low Level Access Functions for Weak Pointer Objects, *E* 52
 Low Level Routines to Modify and Create Stabilizer Chains, *R* 421
 Lucas, R 152

M

m_N , R 159
 Macintosh, R 834
 MacOS, R 835
`Magma`, R 316
`MagmaByGenerators`, R 316
`MagmaByMultiplicationTable`, R 317
 Magma Categories, *R* 315
`MagmaElement`, R 317
 Magma Generation, *R* 316
`MagmaHomomorphismByFunctionNC`, R 305
 Magma Homomorphisms, *R* 305
`MagmaRingModuloSpanOfZero`, R 661
 Magma Rings modulo Relations, *R* 660
 Magma Rings modulo the Span of a Zero Element, *R* 661
 Magmas Defined by Multiplication Tables, *R* 317
`MagmaWithInverses`, R 316
`MagmaWithInversesByGenerators`, R 316
`MagmaWithInversesByMultiplicationTable`, R 317
`MagmaWithOne`, R 316
`MagmaWithOneByGenerators`, R 316
`MagmaWithOneByMultiplicationTable`, R 317
 Main Loop, *R* 64
`MakeConfluent`, R 341
`MakeHomChain`, N 21
`MakeImmutable`, R 112
`makeindex`, E 26
`MakeReadOnlyGlobal`, R 44
`MakeReadWriteGlobal`, R 44
 Making transformation semigroups, *R* 536
`manual.bbl`, E 26
`manual.bib`, E 26
`manual.dvi`, E 26
`manual.lab`, E 26
`manual.mst`, E 26
`manual.six`, E 26
`manual.tex`, E 26
 Manual Conventions, *R* 20
`manualindex`, E 26
 map, parametrized, R 804
`MappedWord`, R 323
`MappingByFunction`, R 300
`MappingPermListList`, R 410
 Mappings that Respect Addition, *R* 307
 Mappings that Respect Multiplication, *R* 306
 Mappings which are Compatible with Algebraic Structures, *R* 305
 maps, R 795
 maps-to operator, T 25
`MarksTom`, R 703
`MatAlgebra`, R 613
`MatClassMultCoeffsCharTable`, R 741
 mathematics alignments, E 23
 mathematics displays, E 23
`MathieuGroup`, R 508
`MatLieAlgebra`, R 636
 matrices, T 36
 commutator, R 221
 Matrices as Basis of a Row Space, *R* 229
 Matrices as Linear Mappings, *R* 230
 Matrices over Finite Fields, *R* 232
 Matrices Representing Linear Equations and the Gaussian Algorithm, *R* 225
`MatrixAlgebra`, R 613
`MatrixAutomorphisms`, R 757
 matrix automorphisms, R 798
`MatrixByBlockMatrix`, R 235
 Matrix Constructions, *R* 223
 Matrix Groups in Characteristic 0, *R* 428
`MatrixLieAlgebra`, R 636
`MatrixOfAction`, R 629
 matrix spaces, R 601
`MatScalarProducts`, R 771
`MatTom`, R 705
`MaximalAbelianQuotient`, R 368
`MaximalBlocks`, R 403

MaximalNormalSubgroups, R 370
MaximalSubgroupClassReps, R 369
MaximalSubgroups, R 369
 for groups with pcgs, R 446
MaximalSubgroupsLattice, R 371
MaximalSubgroupsTom, R 709
Maximum, R 196
MaximumList, R 197
MeatAxe Modules, R 691
MeetEquivalenceRelations, R 313
MeetMaps, R 807
MeetPartitionStrat, E 59
 meet strategy, E 59
Membership Test for Collections, R 272
Membership Test for Lists, R 179
method, P 11
Method Installation, P 11
methods, T 72
 immediate, T 74
 selection, T 73
 true, T 74
MinimalElementCosetStabChain, R 420
MinimalGeneratingSet, R 375
 for groups with pcgs, R 446
MinimalNonmonomialGroup, R 823
Minimal Nonmonomial Groups, R 823
MinimalNormalSubgroups, R 370
MinimalPolynomial, R 671
 over a field, R 575
 over a ring, R 671
Minimal Polynomials, R 671
MinimalStabChain, R 418
MinimalSupergroupsLattice, R 371
MinimalSupergroupsTom, R 710
MinimizedBombieriNorm, R 673
Minimum, R 196
MinimumList, R 197
MinusCharacter, R 813
Miscellaneous, R 141
Miscellaneous Name Changes or Removed Names,
 R 844
mod, integers, R 134
 laurent polynomials, R 665
 lists, R 185
 rationals, R 48
mod, R 48
 arithmetic operators, R 48
 for character tables, R 728
 residue class rings, R 133
modular inverse, R 48
modular remainder, R 48
modular roots, R 139
ModuleByRestriction, R 631
Module Constructions, R 691
Module Homomorphisms, R 694
ModuleOfExtension, R 455
Modules over Lie Algebras and Their Cohomology,
 R 649
Modules over Semisimple Lie Algebras, R 651
modulo, R 48
 arithmetic operators, R 48
 for pcgs, R 438
 residue class rings, R 133
ModuloPcgs, R 438
MoebiusMu, R 140
MoebiusTom, R 705
Molien Series, R 784
MolienSeries, R 784
MolienSeriesInfo, R 785
MolienSeriesWithGivenDenominator, R 786
Monoid, R 540
MonoidByGenerators, R 540
MonoidByMultiplicationTable, R 541
MonoidOfRewritingSystem, R 548
MonomialComparisonFunction, R 678
MonomialExtGrlexLess, R 680
MonomialExtrepComparisonFun, R 678
MonomialGrevlexOrdering, R 679
MonomialGrlexOrdering, R 679
MonomialLexOrdering, R 678
Monomial Orderings, R 677
MonomialTotalDegreeLess, R 844
monomorphisms, find all, R 389
MorClassLoop, R 389
More about Boolean Lists, R 209
More About Global Variables, R 44
More about Tables of Marks, R 697
MostFrequentGeneratorFpGroup, R 465
MovedPoints, R 409
Moved Points of Permutations, R 408
MTX.BasesCompositionSeries, R 693
MTX.BasesMaximalSubmodules, R 693
MTX.BasesMinimalSubmodules, R 692
MTX.BasesMinimalSupermodules, R 693
MTX.BasesSubmodules, R 692
MTX.BasisInOrbit, R 694

MTX.BasisRadical, R 693
MTX.BasisSocle, R 693
MTX.CollectedFactors, R 693
MTX.CompositionFactors, R 693
MTX.DegreeSplittingField, R 692
MTX.Dimension, R 692
MTX.Distinguish, R 694
MTX.Field, R 692
MTX.Generators, R 692
MTX.Homomorphism, R 694
MTX.Homomorphisms, R 694
MTX.InducedAction, R 693
MTX.InducedActionFactorMatrix, R 693
MTX.InducedActionFactorModule, R 693
MTX.InducedActionMatrix, R 693
MTX.InducedActionMatrixNB, R 693
MTX.InducedActionSubmodule, R 693
MTX.InducedActionSubmoduleNB, R 693
MTX.InvariantBilinearForm, R 694
MTX.InvariantQuadraticForm, R 694
MTX.InvariantSesquilinearForm, R 694
MTX.IsAbsolutelyIrreducible, R 692
MTX.IsEquivalent, R 694
MTX.IsIrreducible, R 692
MTX.Isomorphism, R 694
MTX.NormedBasisAndBaseChange, R 693
MTX.OrthogonalSign, R 694
MTX.ProperSubmoduleBasis, R 692
MTX.SubGModule, R 692
MTX.SubmoduleGModule, R 692
multiplication, R 48
matrices, R 220
matrix and matrix list, R 221
matrix and scalar, R 219
matrix and vector, R 220
operation, R 292
scalar and matrix, R 219
scalar and matrix list, R 221
scalar and vector, R 211
vector and matrix, R 220
vector and matrix list, R 221
vector and scalar, R 211
vectors, R 211
MultiplicationTable, R 317
Multiplicative Arithmetic for Lists, *R 183*
Multiplicative Arithmetic Functions, *R 139*
MultiplicativeNeutralElement, R 319
multiplicative order of an integer, R 136
MultiplicativeZero, R 319
MultiplicativeZeroOp, R 289
multiplicity, of constituents of a group character, R 771
multiplier, R 378
multisets, R 192
Multivariate Polynomials, *R 671*
MultRowVector, R 214
Murnaghan components, R 784
Mutability and Copyability, *R 111*
Mutability and Copying, *P 29*
Mutability Status and List Arithmetic, *R 186*
Mutable Bases, *R 600*
MutableBasis, R 600
MutableBasisOfClosureUnderAction, R 619
MutableBasisOfIdealInNonassociativeAlgebra, R 620
MutableBasisOfNonassociativeAlgebra, R 620
MutableCopyMat, R 224
MutableIdentityMat, R 224
MutableNullMat, R 224
N
n_k, R 160
Name, R 114
NameFunction, R 61
NameRNam, R 262
NamesFilter, R 117
NamesGVars, R 45
NamesLocalVariablesFunction, R 61
NamesOfComponents, P 21
NamesOfFusionSources, R 802
NamesSystemGVars, R 45
NamesUserGVars, R 45
Naming Conventions, *T 79*
NaturalCharacter, R 769
Natural Embeddings related to Magma Rings, *R 659*
NaturalHomomorphismByGenerators, R 305
NaturalHomomorphismByIdeal, R 625
NaturalHomomorphismByNormalSubgroup, R 368
NaturalHomomorphismByNormalSubgroupNC, R 368
NaturalHomomorphismBySubAlgebraModule, R 632
NaturalHomomorphismBySubspace, R 605
NearAdditiveGroup, R 553
NearAdditiveGroupByGenerators, R 553
NearAdditiveMagma, R 553
NearAdditiveMagmaByGenerators, R 553
NearAdditiveMagmaWithZero, R 553

NearAdditiveMagmaWithZeroByGenerators, R 553
NearlyCharacterTablesFamily, R 725
negative number, R 48
NegativeRoots, R 641
NegativeRootVectors, R 641
NestingDepthA, R 181
NestingDepthM, R 182
New Arithmetic Operations vs. New Objects, *P* 63
NewAttribute, P 17
 example, P 37
 mutable, P 17
NewCategory, P 16
NewDictionary, N 9
NewFamily, P 19
NewFilter, P 18
NewInfoClass, R 79
newline, R 41
newline character, R 247
NewmanInfinityCriterion, R 475
NewOperation, P 18
New Presentations and Presentations for Subgroups,
 R 470
NewProperty, P 17
NewRepresentation, P 17
 example, P 38
NewType, P 20
NextIterator, R 274
NextPrimeInt, R 131
NF, R 587
NiceBasis, R 607
NiceBasisFiltersInfo, R 608
NiceFreeLeftModule, R 607
NiceFreeLeftModuleInfo, R 607
NiceMonomorphism, R 385
NiceMonomorphismAutomGroup, R 388
Nice Monomorphisms, *R* 385, *T* 56
NiceObject, R 385
NiceVector, R 607
NilpotencyClassOfGroup, R 362
NilpotentQuotientOfFpLieAlgebra, R 648
NK, R 160
NOAUTO, R 840
NOfCyc, T 79
NonnegativeIntegers, R 125
NonnegIntScalarProducts, R 810
NonNilpotentElement, R 646
Norm, R 575
 of character, R 771
NormalBase, R 577
NormalClosure, R 358
NormalFormIntMat, R 239
Normal Forms of Integer Matrices - Name Changes,
 R 844
Normal Forms over the Integers, *R* 237
NormalIntersection, R 358
NormalizedElementOfMagmaRingModulo-
 Relations, R 660
NormalizedWhitespace, R 251
Normalizer, R 357
normalizer, R 357
NormalizerInGLnZ, R 429
NormalizerInGLnZBravaisGroup, R 429
NormalizersTom, R 707
NormalizerTom, R 707
NormalizeWhitespace, R 251
NormalSeriesByPcgs, R 442
Normal Structure, *R* 357
NormalSubgroupClasses, R 759
NormalSubgroupClassesInfo, R 759
NormalSubgroups, R 370
NormedRowVector, R 212
NormedRowVectors, R 604
NormedVectors, R 844
not, R 168
Notions of Generation, *T* 69
NrArrangements, R 147
NrBasisVectors, R 600
NrCombinations, R 146
NrConjugacyClasses, R 356
 for character tables, R 730
NrConjugacyClassesGL, R 512
NrConjugacyClassesGU, R 512
NrConjugacyClassesPGL, R 512
NrConjugacyClassesPGU, R 512
NrConjugacyClassesPSL, R 512
NrConjugacyClassesPSU, R 512
NrConjugacyClassesSL, R 512
NrConjugacyClassesSILIsogeneous, R 512
NrConjugacyClassesSU, R 512
NrConjugacyClassesSUIIsogeneous, R 512
NrDerangements, R 149
NrInputsOfStraightLineProgram, R 335
NrMovedPoints, R 409
NrOrderedPartitions, R 151
NrPartitions, R 150
NrPartitionsSet, R 149

NrPartitionTuples, R 152
NrPermutationsList, R 148
NrPolyhedralSubgroups, R 740
NrPrimitiveGroups, R 523
NrRestrictedPartitions, R 151
NrSubsTom, R 703
NrTransitiveGroups, R 514
NrTuples, R 148
NrUnorderedTuples, R 147
NullAlgebra, R 614
NullMat, R 223
NullspaceIntMat, R 236
NullspaceMat, R 225
NullspaceMatDestructive, R 225
NullspaceModQ, R 234
Number, R 198
 number, Bell, R 145
 binomial, R 144
 Stirling, of the first kind, R 145
 Stirling, of the second kind, R 146
NumberArgumentsFunction, R 61
NumberFFVector, R 213
 number field, R 588
 number fields, Galois group, R 591
NumberIrreducibleSolvableGroups, R 525
NumberPerfectGroups, R 519
NumberPerfectLibraryGroups, R 519
NumberSmallGroups, R 516
NumberSyllables, R 331
Numerator, T 79
 numerator, of a rational, R 143
NumeratorOfModuloPcgs, R 438
NumeratorOfRationalFunction, R 666
NumeratorRat, R 143
 Numerical Group Attributes, *R 364*
O
 0, Operation mark-up, E 16
 $O_p(G)$, see **PCore**, R 357
ObjByExtRep, P 29, R 653
Objectify, P 20
ObjectifyWithAttributes, P 20
 Objects, *R 109*
 objects, T 22
 objects, vs. elements, *T 24*
 vs. variables, *T 22*
 obsolete, R 843
OCOneCocycles, R 377
 octal character codes, R 247
OctaveAlgebra, R 613
od, R 53
OldGeneratorsOfPresentation, R 493
Omega, R 361
ONanScottType, R 413
OnBreak, R 68
OnBreakMessage, R 69
One, N 17, R 288
OneAttr, R 288
OneCoboundaries, R 376
OneCocycles, R 376
 one cohomology, R 375
OneFactorBound, R 673
OneImmutable, R 288
OneIrreducibleSolvableGroup, R 525
OneLibraryGroup, R 514
OneMutable, R 288
OneOfPcgs, R 433
OneOp, R 288
OnePrimitiveGroup, R 514
OneSameMutability, R 288
OneSM, R 288
OneSmallGroup, R 516
OneTransitiveGroup, R 514
OnIndeterminates, R 671
 as a permutation action, R 394
OnLeftInverse, R 393
OnLines, R 394
 example, R 509
OnPairs, R 393
OnPoints, R 393
OnRight, R 393
OnSets, R 393
OnSetsDisjointSets, R 394
OnSetsSets, R 393
OnSetsTuples, R 394
OnSubspacesByCanonicalBasis, R 395
OnTuples, R 393
OnTuplesSets, R 394
OnTuplesTuples, R 394
Operation, R 843
 operation, P 11
OperationAlgebraHomomorphism, R 625
 Operational Structure of Domains, *R 282*
 Operation Functions, *E 48*
OperationHomomorphism, R 843
 operations, T 75

for booleans, R 167
 Operations and Attributes for Vector Spaces, *R* 594
 Operations and Mathematical Terms, *P* 14
 Operations and Methods, *P* 11
 Operations applicable to All Streams, *R* 97
 Operations Concerning Blocks, *R* 735
 Operations for (Near-)Additive Magmas, *R* 555
 Operations for Abelian Number Fields, *R* 587
 operations for algebraic elements, R 686
 Operations for Associative Words, *R* 330
 Operations for Associative Words by their Syllables, *R* 331
 Operations for Booleans, *R* 167
 Operations for Brauer Characters, *R* 793
 Operations for Class Functions, *R* 770
 Operations for Collections, *R* 270
 Operations for Cyclotomics, *R* 154
 Operations for Domains, *R* 287
 Operations for Finite Field Elements, *R* 580
 Operations for Finitely Presented Groups, *R* 461
 Operations for Group Homomorphisms, *R* 382
 Operations for Input Streams, *R* 98
 Operations for Lists, *R* 194
 Operations for Output Streams, *R* 100
 Operations for Pc Groups, *R* 453
 Operations for Rational Functions, *R* 665
 Operations for Special Kinds of Bases, *R* 599
 Operations for Stabilizer Chains, *R* 419
 Operations for Vector Space Bases, *R* 597
 Operations for Words, *R* 323
 Operations on elements of the algebra, *R* 341
 Operations on hom cosets, *N* 14
 Operations on rewriting systems, *R* 340
 Operations Records, *T* 82
 Operations to Evaluate Strings, *R* 253
 Operations to Produce or Manipulate Strings, *R* 250
 Operations vs. Dispatcher Functions, *T* 82
 Operations which have Special Methods for Groups with Pcs, *R* 446
 operators, *R* 42, *T* 21
 arithmetic, R 48
 associativity, R 49
 for cyclotomics, R 158
 for lists, R 180
 precedence, R 49
 Operators for Character Tables, *R* 728
 Operators for Matrices, *R* 219
 Operators for Row Vectors, *R* 210
 Optimization and Compiler Options, *R* 832
 options, *R* 824
 command line, filenames, R 29
 command line, internal, R 31
 options, under UNIX, *R* 27
 or, R 167
 Orbit, *R* 395, *T* 78
 OrbitFusions, *R* 803
 OrbitGenerators, *N* 16
 OrbitGeneratorsInv, *N* 17
 OrbitGeneratorsOfGroup, *N* 20
 OrbitishF0, *E* 49
 OrbitLength, *R* 396
 OrbitLengths, *R* 396
 OrbitLengthsDomain, *R* 396
 OrbitPerms, *R* 411
 OrbitPowerMaps, *R* 798
 Orbits, *E* 48
 operation/attribute, *R* 396
 Orbits, *R* 395
 OrbitDomain, *R* 396
 OrbitishOperation, *E* 48
 OrbitPerms, *R* 411
 OrbitStabChain, *R* 420
 OrbitStabilizer, *R* 397
 OrbitStabilizerAlgorithm, *R* 397
 Orbit Stabilizer Methods for Polycyclic Groups, *R* 446
 Order, *R* 291, *T* 78
 of a class function, *R* 767
 order, of a group, *R* 345
 of a list, collection or domain, *R* 269
 of the prime residue group, *R* 135
 OrderedPartitions, *R* 150
 ordered partitions, *E* 55
 ordering, booleans, R 167
 of records, *R* 261
 OrderingByLessThanFunctionNC, *R* 276
 OrderingByLessThanOrEqualFunctionNC, *R* 276
 OrderingOfRewritingSystem, *R* 340
 OrderingOnGenerators, *R* 278
 OrderingsFamily, *R* 276
 Orderings on families of associative words, *R* 278
 OrderMod, *R* 136
 OrderOfRewritingSystem, *R* 340
 OrdersClassRepresentatives, *R* 731
 OrdersTom, *R* 703
 Ordinal, *R* 254

ordinary character, R 770
OrdinaryCharacterTable, R 730
OrthogonalComponents, R 783
 Orthogonal Embeddings, *R 243*
OrthogonalEmbeddings, R 243
OrthogonalEmbeddingsSpecialDimension, R 779
 OSX, R 834
 Other Filters, *R 124*
 Other Operations Applicable to any Object, *R 114*
 Other Operations for Character Tables, *R 739*
 Other Operations for Tables of Marks, *R 707*
 output, suppressing, R 64
OutputLogTo, R 94

- for streams, R 101
- stop logging output, R 94

OutputTextFile, R 102
OutputTextNone, R 105
OutputTextString, R 103
OutputTextUser, R 103
 overload, P 14

P

P, Property mark-up, E 16
 p -group, R 363
 package, R 839
 Package Completion, *E 40*
 Package Interface - Obsolete Functions and Name Changes, *R 843*
 Packages, *R 828*
PadicCoefficients, R 241
PadicExtensionNumberFamily, R 689
PadicNumber, R 689

- for pure padics, R 688

PadicValuation, R 564
Pager, R 25
Parametrized, R 806
 Parametrized Maps, *R 804*
 parametrized maps, R 795
Parent, R 286
ParentPcgs, R 436
 Parents, *R 286*
 Parents and Subgroups, *T 83*
PartialFactorization, R 132
 Partial Methods, *P 13*
 partial order, R 311
PartialOrderByOrderingFunction, R 312
PartialOrderOfHasseDiagram, R 311
Partitions, R 150
 partitions, improper, of an integer, R 151

- ordered, of an integer, R 151
- restricted, of an integer, R 151

PartitionsGreatestEQ, R 151
PartitionsGreatestLE, R 151
PartitionsSet, R 149
PartitionTuples, R 152
PcElementByExponents, R 434
PcElementByExponentsNC, R 434
PCentralLieAlgebra, R 645
PCentralNormalSeriesByPcgsPGroup, R 441
PCentralSeries, R 367
PcGroupCode, R 457
PcGroupCodeRec, R 457
PcGroupFpGroup, R 450
 Pc groups versus fp groups, *R 450*
PcGroupWithPcgs, R 452
Pcgs, R 432
Pcgs.OrbitStabilizer, R 446
 Pcgs and Normal Series, *R 440*
PcgsByPcSequence, R 432
PcgsByPcSequenceNC, R 432
PcgsCentralSeries, R 440
PcgsChiefSeries, R 441
PcgsElementaryAbelianSeries, R 440
PcgsPCentralSeriesPGroup, R 441
PClassPGroup, R 364
PCore, R 357
PcSeries, R 433
PerfectGroup, R 518
 perfect groups, R 518
PerfectIdentification, R 519
PerfectResiduum, R 359
Perform, R 196
Permanent, R 153
 Permanent of a Matrix, *R 153*
PermBounds, R 792
PermCharInfo, R 787
PermCharInfoRelative, R 788
PermChars, R 789
PermCharsTom, R 716
PermComb, R 792
PermGroupOps.ElementProperty, T 78
PermLeftQuoTransformation, R 551
PermList, R 410
PermListList, R 196
Permutation, R 401
PermutationCharacter, R 770

permutation character, R 815
 permutation characters, possible, R 786
PermutationCycle, R 401
PermutationCycleOp, R 401
 Permutation groups, *T* 44
PermutationMat, R 223
PermutationsFamily, R 407
 Permutations Induced by Elements and Cycles,
R 401
PermutationsList, R 148
PermutationTom, R 702
Permuted, R 197
 as a permutation action, R 395
 for class functions, R 767
PGL, R 511
PGU, R 511
Phi, R 135
 Plain Lists, *T* 27
 Plain Records, *T* 38
 point stabilizer, R 397
 Polycyclic Generating Systems, *R* 431
PolynomialByExtRep, R 684
PolynomialByExtRepNC, R 684
PolynomialCoefficientsOfPolynomial, R 669
PolynomialDivisionAlgorithm, R 680
 Polynomial Factorization, *R* 672
PolynomialModP, R 672
PolynomialReducedRemainder, R 680
PolynomialReduction, R 679
PolynomialRing, R 675
 Polynomial Rings, *R* 675
 Polynomials, *T* 85
 Polynomials as Univariate Polynomials in one
 Indeterminate, *R* 669
 polynomials over abelian number fields, factors,
 R 587
 Polynomials over the Rationals, *R* 672
PopOptions, R 87
 Portability, *R* 89
 Porting GAP, *R* 833
Position, R 187, *T* 78
 Positional Objects, *P* 22
PositionBound, R 188
PositionCanonical, R 187
PositionFirstComponent, R 189
PositionNonZero, R 189
PositionNot, R 189
PositionNthOccurrence, R 187
PositionProperty, R 188
PositionSet, R 188
PositionSorted, R 187
PositionStream, R 99
PositionSublist, R 189
Position vs. PositionCanonical, *T* 49
PositionWord, R 330
PositiveIntegers, R 125
 positive number, R 48
PositiveRoots, R 641
PositiveRootVectors, R 641
PossibleClassFusions, R 802
PossibleFusionsCharTableTom, R 715
 Possible Permutation Characters, *R* 786
 possible permutation characters, R 786
PossiblePowerMaps, R 796
 power, R 48
 matrix, R 220
 meaning for class functions, R 766
 of words, R 330
PowerMap, R 796
PowerMapByComposition, R 798
PowerMapOp, R 796
 Power Maps, *R* 795
PowerMapsAllowedBySymmetrizations, R 813
PowerMod, R 566
PowerModCoeffs, R 216
PowerModInt, R 130
PowerPartition, R 152
 powerset, R 146
PowerSubalgebraSeries, R 618
PQuotient, R 472
 precedence, R 48
 precedence test, for permutations, R 408
PreferredGenerators, N 17
PrefrattiniSubgroup, R 359
 for groups with pcgs, R 446
PreImage, R 304
PreImageElm, R 304
PreImages, R 304
PreImagesElm, R 303
 Preimages in the Free Group, *R* 460
 Preimages in the Free Semigroup, *R* 545
PreimagesOfTransformation, R 550
PreImagesRange, R 303
PreImagesRepresentative, R 304
PreImagesSet, R 304

Preimages under Homomorphisms from an FpGroup, *R* 471
 Preimages under Mappings, *R* 303
 preorder, *R* 311
PresentationFpGroup, *R* 477
PresentationNormalClosure, *R* 482
PresentationNormalClosureRrs, *R* 482
PresentationSubgroup, *R* 480
PresentationSubgroupMtc, *R* 481
PresentationSubgroupRrs, *R* 480
PresentationViaCosetTable, *R* 478
 previous result, *R* 64
PrevPrimeInt, *R* 131
PrimaryGeneratorWords, *R* 481
 primary subgroup generators, *R* 495
PrimeBlocks, *R* 735
PrimeBlocksOp, *R* 735
PrimeField, *R* 574
 Prime Integers and Factorization, *R* 130
PrimePGroup, *R* 364
PrimePowersInt, *R* 133
 prime residue group, *R* 135
 exponent, *R* 136
 generator, *R* 137
 order, *R* 135
 Prime Residues, *R* 135
PrimeResidues, function, *R* 135
Primes, *R* 130
 primitive, *R* 403
PRIMITIVE_INDICES_MAGMA, *R* 524
PrimitiveElement, *R* 574
PrimitiveGroup, *R* 523
 Primitive Groups, *R* 413
PrimitiveGroupsIterator, *R* 523
PrimitiveIdentification, *R* 524
PrimitiveIndexIrreducibleSolvableGroup,
 R 525
 Primitive Permutation Groups, *R* 522
PrimitivePolynomial, *R* 672
PrimitiveRoot, *R* 582
PrimitiveRootMod, *R* 137
 primitive root modulo an integer, *R* 137
 Primitive Roots and Discrete Logarithms, *R* 136
 Primitivity of Characters, *R* 818
Print, *R* 65, *T* 78
PrintAmbiguity, *R* 809
PrintArray, *R* 224
PrintCharacterTable, *R* 744
PrintFactorsInt, *R* 133
PrintFormattingStatus, *R* 101
PrintHashWithNames, *N* 10
 Printing, Viewing and Displaying Finite Field
 Elements, *R* 584
 Printing Character Tables, *R* 741
 Printing Class Functions, *R* 767
 Printing Presentations, *R* 483
 Printing Tables of Marks, *R* 700
PrintObj, *R* 66
 for character tables, *R* 741
 for tables of marks, *R* 700
PrintTo, *R* 94, *T* 78
 for streams, *R* 100
ProbabilityShapes, *R* 673
 problems, *R* 830
 Problems on Particular Systems, *R* 832
 procedure call, *R* 50
 Procedure Calls, *R* 50
 procedure call with arguments, *R* 50
Process, *R* 107
Process, *R* 107
PROD_GF2MAT_GF2MAT_ADVANCED, *R* 234
PROD_GF2MAT_GF2MAT_SIMPLE, *R* 234
 Producing a Manual, *E* 26
Product, *R* 200
 product, of words, *R* 330
 rational functions, *R* 665
ProductCoeffs, *R* 216
ProductOfStraightLinePrograms, *R* 338
ProductSpace, *R* 618
ProductX, *R* 202
ProfileFunctions, *R* 82
ProfileGlobalFunctions, *R* 82
ProfileMethods, *R* 81
ProfileOperations, *R* 81
ProfileOperationsAndMethods, *R* 81
PROFILETHRESHOLD, *R* 82
 Profiling, *R* 81
ProjectedInducedPcgs, *R* 439
ProjectedPcElement, *R* 439
Projection, *N* 18, *R* 301
 example for direct products, *R* 500
 example for semidirect products, *R* 502
 example for subdirect products, *R* 503
 example for wreath products, *R* 503
 for group products, *R* 505
ProjectionMap, *R* 805

projections, find all, R 389
ProjectiveActionHomomorphismMatrixGroup,
 R 426
ProjectiveActionOnFullSpace, R 426
ProjectiveGeneralLinearGroup, R 511
ProjectiveGeneralUnitaryGroup, R 511
ProjectiveOrder, R 233
ProjectiveSpecialLinearGroup, R 511
ProjectiveSpecialUnitaryGroup, R 511
ProjectiveSymplecticGroup, R 511
 prompt, R 64
 partial, R 64
Properties, R 123
 Properties and Attributes for Lists, R 189
 Properties and Attributes of (General) Mappings,
R 301
 Properties and Attributes of Binary Relations, R 310
 Properties and Attributes of Matrices, R 221
 Properties and Attributes of Rational Functions,
R 666
 Properties and basic functionality, R 277
 Properties and Filters, T 73
 Properties of a Lie Algebra, R 639
 Properties of rewriting systems, R 342
 Properties of Rings, R 561
 Properties of Tables of Marks, R 706
PRump, R 360
PseudoRandom, R 273
PSL, R 511
PSP, R 511
PSp, R 511
PSU, R 511
PthPowerImage, R 645
PthPowerImages, R 645
 Pure p-adic Numbers, R 688
PurePadicNumberFamily, R 688
PushOptions, R 87

Q

Quadratic, R 161
 quadratic residue, R 138
QuaternionAlgebra, R 613
QUIET, R 844
QUIT, emergency quit, R 73
 quit, in emergency, R 73
quit, R 67, T 18
QUITTING, R 73
QuoInt, R 128

Quotient, R 557
 quotient, for finitely presented groups, R 459
 matrices, R 220
 matrix and matrix list, R 221
 matrix and scalar, R 220
 of free monoid, R 546
 of free semigroup, R 544
 of words, R 330
 rational functions, R 665
 scalar and matrix, R 220
 scalar and matrix list, R 221
 vector and matrix, R 220
QuotientFromSCTable, R 612
QuotientGroup, N 18
QuotientGroupByChainHomomorphicImage, N 21
QuotientGroupByHomomorphism, N 14
QuotientGroupByImages, N 14
QuotientGroupByImagesNC, N 14
QuotientGroupHom, N 14
Quotient Methods, R 472
QuotientMod, R 566
QuotientPolynomialsExtRep, R 685
QuotientRemainder, R 565
Quotients, R 537
Quotients and Remainders, R 128
QuotientSemigroupCongruence, R 537
QuotientSemigroupHomomorphism, R 537
QuotientSemigroupPreimage, R 537
QuotRemLaurpols, R 674

R

R, Representation mark-up, E 16
r_N, R 159
RadicalGroup, R 359
RadicalOfAlgebra, R 621
Random, R 272
 for integers, R 128
 for rationals, R 143
RandomBinaryRelationOnPoints, R 312
 random element, of a list or collection, R 272
 Random Elements, R 272
RandomHashKey, N 10
RandomInvertableMat, T 79
RandomInvertibleMat, R 225
RandomIsomorphismTest, R 457
Random Isomorphism Testing, R 457
 Randomized Methods for Permutation Groups,
R 415

RandomList, R 273
RandomMat, R 225
 Random Matrices, *R* 225
RandomPrimitivePolynomial, R 584
RandomSchreierSims, N 20
 random seed, R 273
RandomTransformation, R 549
RandomUnimodularMat, R 225
Range, N 15, R 302
 range, R 202
 Ranges, *R* 202, *T* 32
RankAction, R 402
RankFilter, R 116
RankMat, R 225
RankOfTransformation, R 550
RankPGroup, R 364
Rat, R 143
 for strings, R 253
RationalClass, R 356
RationalClasses, R 357
RationalFunctionByExtRep, R 684
RationalFunctionByExtRepNC, R 684
RationalFunctionByExtRepWithCancellation,
 R 685
 Rational Function Families, *R* 681
RationalFunctionsFamily, R 681
RationalizedMat, R 162
Rationals, R 142
RClassOfHClass, R 537
Read, R 93, *T* 19
 for streams, R 98
read.g, for a GAP package, E 38
ReadAll, R 99
ReadAllLine, R 105
ReadAsFunction, R 93
 for streams, R 98
ReadByte, R 98
 read eval print loop, R 64
 read evaluate print loop, *T* 19
 reading source code from a file, *T* 19
ReadLine, R 98
README, for a GAP package, E 36
ReadPackage, R 840
ReadPkg, R 843
ReadTest, R 83
 for streams, R 98
RealClasses, R 733
RealizableBrauerCharacters, R 793
RecFields, T 79
RecNames, R 257
 Recognizing Characters, *R* 249
 record, component access, R 258
 component assignment, R 258
 component variable, R 258
 component variable assignment, R 259
Record Access Operations, *R* 262
Record Assignment, *R* 258
 record assignment, operation, R 262
 record boundness test, operation, R 262
 record component, operation, R 262
 record unbind, operation, R 262
 Recovery from NoMethodFound-Errors, *R* 76
Recursion, *T* 42
 recursion, R 55
Redispatching, *P* 13
RedispatchOnCondition, *P* 13
 redisplay a help section, R 23
 redisplay with next help viewer, R 23
ReduceCoeffs, R 216
ReduceCoeffsMod, R 216
ReducedAdditiveInverse, R 341
ReducedCharacters, R 777
ReducedClassFunctions, R 776
ReducedComm, R 341
ReducedConfluentRewritingSystem, R 547
ReducedConjugate, R 341
ReducedDifference, R 341
ReducedForm, R 340
ReducedGroebnerBasis, R 681
ReducedInverse, R 341
ReducedLeftQuotient, R 341
ReducedOne, R 341
ReducedPcElement, R 434
ReducedPower, R 341
ReducedProduct, R 341
ReducedQuotient, R 341
ReducedScalarProduct, R 341
ReducedSum, R 341
ReducedZero, R 341
ReduceRules, R 341
ReduceStabChain, R 421
 Reducing Virtual Characters, *R* 776
Ree, R 508
ReeGroup, R 508
ReesCongruenceOfSemigroupIdeal, R 536
ReesMatrixSemigroup, R 538

ReesMatrixSemigroupElement, R 539
Rees Matrix Semigroups, *R* 538
ReesZeroMatrixSemigroup, R 539
ReesZeroMatrixSemigroupElement, R 539
ReesZeroMatrixSemigroupElementIsZero, R 539
 reference to a label, E 15
RefinedPcGroup, R 452
ReflectionMat, R 224
ReflexiveClosureBinaryRelation, R 312
 reflexive relation, R 310
 regular, R 402
 regular action, R 399
RegularActionHomomorphism, R 400
RegularModule, R 747
 relations, R 299
 Relations Between Domains, *R* 293
RelationsOfFpSemigroup, R 545
RelativeBasis, R 597
RelativeBasisNC, R 597
 relatively prime, R 48
RelativeOrderOfPcElement, R 434
RelativeOrders, of a pcgs, R 433
 Relators in a Presentation, *R* 483
RelatorsOfFpGroup, R 460
 remainder, operation, R 292
 remainder of a quotient, R 128
RemInt, R 128
Remove, R 174
 remove, an element from a set, R 193
RemoveFile, R 95
RemoveOuterCoeffs, R 214
RemoveRelator, R 485
RemoveSet, R 193
RemoveStabChain, R 421
Repeat, *R* 52
 repeat loop, R 52
ReplacedString, R 251
Representation, *R* 119
 representation, as a sum of two squares, R 141
 Representations for Associative Words, *R* 332
 Representations for Group Homomorphisms, *R* 391
 Representations given by modules, *R* 747
 Representations of Algebras, *R* 626
RepresentationsOfObject, R 120
Representative, R 269
 representative, of a list or collection, R 270
RepresentativeAction, R 398
RepresentativeLinearOperation, R 626
RepresentativeOperation, R 843
RepresentativesContainedRightCosets, R 354
RepresentativesFusions, R 803
RepresentativeSmallest, R 270
RepresentativesMinimalBlocks, R 403
RepresentativesPerfectSubgroups, R 372
RepresentativesPowerMaps, R 798
RepresentativesSimpleSubgroups, R 372
RepresentativeTom, R 714
RepresentativeTomByGenerators, R 714
RepresentativeTomByGeneratorsNC, R 714
 Requesting one GAP Package from within Another,
E 37
RequirePackage, R 843
Reread, R 95
REREADING, R 95
RereadPackage, R 840
RereadPkg, R 843
ResetFilterObj, P 18
ResetOptionsStack, R 87
 residue, quadratic, R 138
 Residue Class Rings, *R* 133
RespectsAddition, R 307
RespectsAdditiveInverses, R 307
RespectsInverses, R 306
RespectsMultiplication, R 306
RespectsOne, R 306
RespectsScalarMultiplication, R 307
RespectsZero, R 307
RestoreStateRandom, R 272
 Restricted and Induced Class Functions, *R* 774
RestrictedClassFunction, R 775
RestrictedClassFunctions, R 775
 Restricted Lie algebras, *R* 644
RestrictedMapping, R 301
RestrictedPartitions, R 151
RestrictedPerm, R 410
RestrictedPermNC, R 410
RestrictedTransformation, R 550
RestrictOutputsOfSLP, R 337
Resultant, R 670
ResultOfStraightLineProgram, R 335
Return, *R* 58
return, R 68
 no value, R 58
 with value, R 58
ReturnFail, R 63
ReturnFalse, R 63

return from break loop, R 68
ReturnTrue, R 63
Reversed, R 195
RewindStream, R 100
RewriteWord, R 466
 Rewriting in Groups and Monoids, *R* 342
 Rewriting Systems and the Knuth-Bendix Procedure, *R* 547
RightActingAlgebra, R 629
RightActingRingOfIdeal, R 560
RightAlgebraModule, R 627
RightAlgebraModuleByGenerators, R 627
RightCoset, R 352
RightCosets, R 353
 right cosets, R 352
RightCosetsNC, R 353
RightDerivations, R 636
RightIdeal, R 558
RightIdealByGenerators, R 559
RightIdealNC, R 559
RightModuleByHomomorphismToMatAlg, R 630
RightShiftRowVector, R 214
RightTransversal, R 353
 right transversal, T 48
Ring, R 556
RingByGenerators, R 557
 Ring Homomorphisms, *R* 308
 Rings With One, *R* 560
RingWithOne, R 560
RingWithOneByGenerators, R 561
RNamObj, R 262
 root, of 1 modulo an integer, R 139
 of an integer, R 127
 of an integer, smallest, R 127
 of an integer modulo another, R 138
RootInt, R 127
RootMod, R 138
RootOfDefiningPolynomial, R 574
RootsMod, R 138
 Roots Modulo Integers, *R* 137
 roots of unity, R 154
RootsOfUPol, R 669
RootsUnityMod, R 139
RootSystem, R 641
RoundCyc, R 156
 Row and Matrix Spaces, *R* 601
RowIndexOfReesMatrixSemigroupElement, R 539
RowIndexOfReesZeroMatrixSemigroupElement, R 539
 row spaces, R 601
 Row Vectors over Finite Fields, *R* 212
Rules, R 340
 Running GAP under MacOS, *R* 31
Runtime, R 81
Runtimes, R 80
S
 s_N , R 159
SameBlock, R 736
SandwichMatrixOfReesMatrixSemigroup, R 539
SandwichMatrixOfReesZeroMatrixSemigroup, R 539
 save, R 37
SaveOnExitFile, R 73
SaveWorkspace, R 37
 Saving and Loading a Workspace, *R* 37
 Saving a Pc Group, *R* 453
 saving on exit, R 73
ScalarProduct, for characters, R 771
Schreier, R 480
 Schreier-Sims, random, R 415
SchreierTransversal, N 16
SchreierTreeDepth, N 17
SchurCover, R 378
 Schur Covers and Multipliers, *R* 378
 Schur multiplier, R 378
 scope, R 43
ScriptFromString, R 711
 Searching for Homomorphisms, *R* 389
SecHMSM, R 255
 secondary subgroup generators, R 495
SecondsDMYhms, R 255
SeekPositionStream, R 100
 Selecting a Different MeatAxe, *R* 692
 Selection Functions, *R* 513
SemidirectProduct, R 501
 Semidirect Products, *R* 501
SemiEchelonBasis, R 603
SemiEchelonBasisNC, R 603
SemiEchelonMat, R 227
SemiEchelonMatDestructive, R 228
SemiEchelonMats, R 228
SemiEchelonMatsDestructive, R 228
SemiEchelonMatTransformation, R 228
Semigroup, R 534

semigroup, R 534
SemigroupByGenerators, R 534
SemigroupByMultiplicationTable, R 535
SemigroupIdealByGenerators, R 536
SemigroupOfRewritingSystem, R 548
semiregular, R 402
Semisimple Lie Algebras and Root Systems, *R* 640
SemiSimpleType, R 640
sequence, Bernoulli, R 145
 Fibonacci, R 152
 Lucas, R 153
Series of Ideals, *R* 638
Set, R 266
SetAssertionLevel, R 80
SetCommutator, R 451
SetConjugate, R 451
SetCrystGroupDefaultAction, R 430
set difference, of collections, R 271
SetElmWPObj, E 52
SetEntrySCTable, R 611
SetFilterObj, P 18
SetGasmanMessageStatus, R 86
SetHashEntry, N 12
SetHashEntryAtLastIndex, N 12
SetHelpViewer, R 24
SetIndeterminateName, R 664
SetInfoLevel, R 79
SetName, R 114
Set Operations via Boolean Lists, *R* 207
SetParent, R 286
SetPower, R 451
SetPrintFormattingStatus, R 101
SetRecursionTrapInterval, R 85
SetReducedMultiplication, R 460
Sets, *R* 110, *T* 31
sets, R 192
Sets of Subgroups, *R* 369
set stabilizer, R 397
Setter, R 121
setter, R 121
 of an attribute, T 72
Setter and Tester for Attributes, *R* 121
SetX, R 202
ShallowCopy, R 113, *T* 80
 for lists, R 177
ShiftedCoeffs, R 216
ShiftedPadicNumber, R 688
Shifting and Trimming Coefficient Lists, *R* 214
ShortestVectors, R 243
ShortLexOrdering, R 279
short vectors spanning a lattice, R 241
ShowArgument, R 76
ShowArguments, R 76
ShowDetails, R 76
ShowImpliedFilters, R 117
ShowMethods, R 77
ShowOtherMethods, R 77
ShrinkCoeffs, R 217
ShrinkRowVector, R 214
Sift, for chains of subgroups, N 19
SiftedPcElement, R 434
SiftedPermutation, R 420
SiftedVector, R 604
SiftOneLevel, for chains of subgroups, N 19
 for subgroup transversals, N 16
Sigma, R 139
sign, of an integer, R 126
Sign and Cycle Structure, *R* 409
SignInt, R 126
SignPartition, R 151
SignPerm, R 409
SimpleLieAlgebra, R 636
SimpleSystem, R 641
SimplifiedFpGroup, R 479
SimplifiedFpGroup, *R* 479
SimplifyPresentation, R 486
SimsNo, R 524
SimultaneousEigenvalues, R 234
SingleCollector, R 451
singlequote character, R 247
singlequotes, R 245
SINT_CHAR, R 253
Size, R 269
 for character tables, R 730
 for groups with pcgs, R 446
size, of a list or collection, R 269
SizeBlist, R 207
SizeConsiderFunction, R 374
SizeNumbersPerfectGroups, R 519
SizeOfChainOfGroup, N 20
SizeOfFieldOfDefinition, R 793
SizesCentralizers, R 731
SizesConjugacyClasses, R 731
SizeScreen, R 75
 SizeScreen, *R* 75
SizesPerfectGroups, R 518

SizeStabChain, R 419
SL, R 509
 smaller, associative words, R 329

- elements of finitely presented groups, R 460
- nonassociative words, R 323
- pcwords, R 449
- rational functions, R 666

SmallerDegreePermutationRepresentation, R 412
 smaller or equal, R 47
 smaller test, R 47
SmallestGeneratorPerm, R 408
SmallestMovedPoint, R 408
SmallestRootInt, R 127
SmallGeneratingSet, R 375
SmallGroup, R 516
 Small Groups, R 515
SmallGroupsInformation, R 516
 Smash MeatAxe Flags, R 696
 smith normal form, R 844
SmithNormalFormIntegerMat, R 238
SmithNormalFormIntegerMatTransforms, R 238
SMTX.AbsoluteIrreducibilityTest, R 695
SMTX.AlgEl, R 696
SMTX.AlgElCharPol, R 696
SMTX.AlgElCharPolFac, R 696
SMTX.AlgElMat, R 696
SMTX.AlgElNullspaceDimension, R 696
SMTX.AlgElNullspaceVec, R 696
SMTX.CentMat, R 696
SMTX.CentMatMinPoly, R 696
SMTX.CompleteBasis, R 695
SMTX.Getter, R 695
SMTX.GoodElementGModule, R 695
SMTX.IrreducibilityTest, R 695
SMTX.MatrixSum, R 695
SMTX.MinimalSubGModule, R 695
SMTX.MinimalSubGModules, R 695
SMTX.RandomIrreducibleSubGModule, R 695
SMTX.Setter, R 695
SMTX.SortHomGModule, R 695
SMTX.Subbasis, R 696
SO, R 510
Socle, R 360
SocleTypePrimitiveGroup, R 413
SolutionIntMat, R 236
SolutionMat, R 226
SolutionMatDestructive, R 226
SolutionNullspaceIntMat, R 236
 Some Remarks about Character Theory in GAP, R 719
 Some Special Algebras, R 613
Something, T 70
Sort, R 191
SortedCharacters, R 755
SortedCharacterTable, R 755
 Sorted Character Tables, R 754
SortedList, R 266
 sorted list, R 190
 Sorted Lists and Sets, R 192
 sorted lists as collections, R 264
SortedSparseActionHomomorphism, R 399
SortedTom, R 701
Sortex, R 191
 Sorting Lists, R 191
SortingPerm, R 192
 Sorting Tables of Marks, R 701
SortParallel, R 191
Source, N 15, R 302
SourceElt, N 14
SourceOfIsoclinicTable, R 753
SP, R 510
Sp, R 510
 space, R 41
SparseActionHomomorphism, R 399
SparseCartanMatrix, R 642
SparseHashTable, N 11
 Sparse hash tables, N 11
SparseIntKey, N 11
 Special Characters, R 247
 special character sequences, R 247
 Special Filenames, R 92
 Special Generating Sets, R 375
SpecialLinearGroup, R 509
 Special Multiplication Algorithms for Matrices over GF(2), R 234
SpecialOrthogonalGroup, R 510
 Special Pcs, R 443
 SpecialPcs, attribute, R 443
SpecialUnitaryGroup, R 510
 Specific and Parametrized Subgroups, R 358
 Specific Methods for Subgroup Lattice Computations, R 372
SplitCharacters, R 749
SplitExtension, R 455
SplitExtensions, R 456

SplitString, R 250
SplittingField, R 668
Sqrt, R 292
 square root, of an integer, R 127
SquareRoots, R 320
SSortedList, R 266
StabChain, R 417
StabChainBaseStrongGenerators, R 418
StabChainImmutable, R 417
StabChainMutable, R 417
StabChainOp, R 417
StabChainOptions, R 418
 Stabiliser chain subgroups, *N* 20
Stabilizer, R 397
 Stabilizer Chain Records, *R* 418
 Stabilizer Chains, *R* 414
 Stabilizer Chains for Automorphisms Acting on
 Enumerators, *E* 61
StabilizerOfExternalSet, R 405
StabilizerPcgs, R 446
 Stabilizers, *R* 397
 Standalone Programs in a GAP Package, *E* 38
StandardAssociate, R 563
StandardGeneratorsFunctions, R 711
StandardGeneratorsInfo, for groups, R 710
 for tables of marks, R 715
StandardGeneratorsOfGroup, R 712
 Standard Generators of Groups, *R* 710
 Standardization of coset tables, *R* 465
StandardizeTable, R 465
StarCyc, R 161
 Starting and Leaving GAP, *T* 18
 starting GAP, *T* 18
 Statements, *R* 49
StateRandom, R 272
Stirling1, R 145
Stirling2, R 146
 Stirling number of the first kind, R 145
 Stirling number of the second kind, R 146
StoredGroebnerBasis, R 681
StoreFusion, R 801
 Storing Normal Subgroup Information, *R* 759
StraightLineProgElm, R 338
StraightLineProgGens, R 339
StraightLineProgram, R 334
 Straight Line Program Elements, *R* 338
StraightLineProgramNC, R 334
 Straight Line Programs, *R* 334
StraightLineProgramsTom, R 713
StratMeetPartition, E 59
StreamsFamily, R 97
StretchImportantSLPElement, R 339
 strictly sorted list, R 190
String, R 250
 for cyclotomics, R 156
StringDate, R 255
StringOfResultOfStraightLineProgram, R 336
StringPP, R 250
 strings, T 29
 equality of, R 249
 inequality of, R 249
 lexicographic ordering of, R 249
String Streams, *R* 103
StringTime, R 255
StrongGeneratorsStabChain, R 419
StrongGens, N 20
StronglyConnectedComponents, R 312
Struct, R 283
StructByGenerators, R 284
StructuralCopy, R 113, T 80
 for lists, R 177
 structure constant, R 741
StructureConstantsTable, R 599
StructureDescription, R 350
 Structure Descriptions, *R* 350
StructWithGenerators, R 284
SU, R 510
Subalgebra, R 614
SubAlgebraModule, R 630
SubalgebraNC, R 614
 Subalgebras, *R* 614
SubalgebraWithOne, R 614
SubalgebraWithOneNC, R 615
SubdirectProduct, R 503
 Subdirect Products, *R* 503
SubdirectProducts, R 503
 Subdomains, *T* 71
 subdomains, R 287
Subfield, R 574
SubfieldNC, R 574
Subfields, R 574
 Subfields of Fields, *R* 574
Subgroup, R 347
SubgroupByPcgs, R 437
SubgroupByProperty, R 348
 subgroup fusions, R 799

- subgroup generators tree, R 495
Subgroup Lattice, *R 370*
SubgroupNC, R 347
SubgroupOfWholeGroupByCosetTable, R 466
SubgroupOfWholeGroupByQuotientSubgroup,
R 472
Subgroup Presentations, *R 480*
SubgroupProperty, R 422
Subgroups, Subgroups, as Stabilizers, *T 50*
Subgroups, *R 347*
 subgroups, polyhedral, R 740
 Subgroups characterized by prime powers, *R 361*
Subgroup Series, *R 365*
SubgroupShell, R 348
 Subgroups of Polycyclic Groups - Canonical Pcs,
R 437
 Subgroups of Polycyclic Groups - Induced Pcs,
R 436
SubgroupsSolvableGroup, R 373
sublist, R 171
 access, R 171
 assignment, R 173
 operation, R 172
sublist assignment, operation, R 174
Submagma, R 316
SubmagmaNC, R 316
SubmagmaWithInverses, R 316
SubmagmaWithInversesNC, R 316
SubmagmaWithOne, R 316
SubmagmaWithOneNC, R 316
Submodule, R 569
SubmoduleNC, R 569
Submodules, *R 569*
Submonoid, R 540
SubmonoidNC, R 540
SubnearAdditiveGroup, R 554
SubnearAdditiveGroupNC, R 554
SubnearAdditiveMagma, R 554
SubnearAdditiveMagmaNC, R 554
SubnearAdditiveMagmaWithZero, R 554
SubnearAdditiveMagmaWithZeroNC, R 554
SubnormalSeries, R 365
Subring, R 557
SubringNC, R 557
SubringWithOne, R 561
SubringWithOneNC, R 561
 Subroutines for the Construction of Class Fusions,
R 814
 Subroutines for the Construction of Power Maps,
R 812
 subsection mark-up, E 16
Subsemigroup, R 534
SubsemigroupNC, R 534
subsets, R 146
 subset test, for collections, R 270
Subsomething, T 71
SubsomethingNC, T 71
Subspace, R 593
SubspaceNC, R 593
Subspaces, R 595
SubstitutedWord, R 331
SubsTom, R 703
Substruct, R 287
SubstructNC, R 287
SubSyllables, R 332
 subtract, a set from another, R 194
SubtractBlist, R 208
 subtraction, R 48
 matrices, R 219
 matrix and scalar, R 219
 rational functions, R 665
 scalar and matrix, R 219
 scalar and matrix list, R 221
 scalar and vector, R 211
 vector and scalar, R 211
 vectors, R 211
SubtractSet, R 194
Subword, R 330
Successors, R 311
 Suitability for Compilation, *R 36*
Sum, R 200
 Sum and Intersection of Pcs, *R 442*
SumFactorizationFunctionPcs, R 442
SumIntersectionMat, R 229
SumX, R 202
SupersolvableResiduum, R 360
 support, email address, R 831, T 16
SupportedCharacterTableInfo, R 723
 Suppressing Indexing and Labelling of a Section and
 Resolving Label Clashes, *E 15*
SurjectiveActionHomomorphismAttr, R 406
SuzukiGroup, R 508
SylowComplement, R 360
SylowSubgroup, R 360
 Sylow Subgroups and Hall Subgroups, *R 360*
SylowSystem, R 361

Symbols, *R 40*
 Symmetric and Alternating Groups, *R 412*
`SymmetricClosureBinaryRelation`, R 312
`SymmetricGroup`, R 508
 symmetric group, powermap, R 152
`SymmetricParentGroup`, R 413
`SymmetricParts`, R 783
`SymmetricPowerOfAlgebraModule`, R 655
 symmetric relation, R 311
`Symmetrizations`, R 782
 symmetrizations, orthogonal, R 783
 symplectic, R 784
 Symmetrizations of Class Functions, *R 782*
`SymplecticComponents`, R 784
`SymplecticGroup`, R 510
 syntax errors, R 64
 system getter, R 120
 system setter, R 120
`Sz`, R 508

T

t_N , R 159
`TableAutomorphisms`, R 757
 table automorphisms, R 815
`TableHasIntKeyFun`, N 11
 table of chapters for help books, R 23
`TableOfMarks`, R 698
`TableOfMarksByLattice`, R 699
`TableOfMarksComponents`, R 702
`TableOfMarksCyclic`, R 717
`TableOfMarksDihedral`, R 717
`TableOfMarksFamily`, R 702
`TableOfMarksFrobenius`, R 717
 Table of Marks Objects in GAP, *R 698*
 table of sections for help books, R 23
 tables, E 23, R 721
 Tables, Displayed Mathematics and Mathematics Alignments, E 23
 tabulator, R 41
`Tau`, R 139
 Technical Details about Tables of Marks, *R 702*
 Technical Details about the Implementation of Magma Rings, *R 661*
 Technical Matters Concerning General Mappings, *R 308*
`TemporaryGlobalVarName`, R 46
`Tensored`, R 774
`TensorProductGModule`, R 691
`TensorProductOfAlgebraModules`, R 654
 Tensor Products and Exterior and Symmetric Powers, *R 654*
 test, for a primitive root, R 137
 for a rational, R 142
 for records, R 257
 for set equality, R 193
`TestConsistencyMaps`, R 808
`Tester`, R 121
 tester, R 121
 of an attribute, T 72
`Test Files`, *R 83*
 Test for the Existence of GAP Package Binaries, *E 39*
`TestHomogeneous`, R 818
`TestInducedFromNormalSubgroup`, R 820
 Testing Finiteness of Finitely Presented Groups, *R 475*
 Testing for the System Architecture, *R 35*
 Testing Monomiality, *R 820*
 Testing the Examples, *E 24*
`TestJacobi`, R 611
`TestMonomial`, R 820
`TestMonomialQuick`, R 821
`TestMonomialUseLattice`, R 821
 Test of the installation, *R 827*
`TestPackageAvailability`, R 841
`TestPerm1`, R 790
`TestPerm2`, R 790
`TestPerm3`, R 790
`TestPerm4`, R 790
`TestPerm5`, R 790
`TestQuasiPrimitive`, R 819
`TestRelativelySM`, R 822
 Tests for Actions, *R 402*
 Tests for the Availability of Methods, *R 378*
`TestSubnormallyMonomial`, R 822
 TeX Macros, *E 16*
 TeX Macros for Domains, *E 20*
 The .gaprc file, *R 33*
 The Adjoint Representation, *R 646*
 The Compiler, *R 35*
 The Defining Attributes of Rational Functions, *R 683*
 The Dixon-Schneider Algorithm, *R 748*
 The Documentation, *R 829*
 The External Representation for Associative Words, *R 334*

The family pcgs, *R* 449
The Files of a GAP Package, *E* 35
The GAP System, *T* 10
The GASMAN Interface for Weak Pointer Objects, *E* 53
The General Backtrack Algorithm with Ordered Partitions, *E* 55
The Help Book Handler, *E* 43
The Info Mechanism, *T* 85
The Interface between Character Tables and Groups, *R* 725
The Interface between Tables of Marks and Character Tables, *R* 715
The Library of Tables of Marks, *R* 718
The Main File, *E* 11
The manual.six File, *E* 43
then, *R* 51
The Natural Action, *R* 411
The PackageInfo.g File, *E* 37
The Pager Command, *R* 25
The Permutation Image of an Action, *R* 398
The Representations of Rational Functions, *R* 682
The Smash MeatAxe, *R* 695
The Syntax in BNF, *R* 59
The WWW Homepage of a Package, *E* 37
ThreeGroup library, *R* 516
Tietze Options, *R* 498
Tietze Transformations, *R* 485
Tietze Transformations that introduce new Generators, *R* 490
TietzeWordAbstractWord, *R* 483
time, *R* 81
Timing, *R* 80
Todd-Coxeter Procedure, *R* 548
Trace, *R* 222
 for field elements, *R* 576
 of a matrix, *R* 222
TracedCosetFpGroup, *R* 463
TraceImmediateMethods, *R* 78
TraceMat, *R* 222
TraceMethods, *R* 78, *T* 75
TracePolynomial, *R* 575
Tracing generator images through Tietze transformations, *R* 493
Tracing Methods, *R* 78
TransferDiagram, *R* 808
Transformation, *R* 549
TransformationData, *R* 549
TransformationFamily, *R* 549
TransformationNC, *R* 549
TransformationRelation, *R* 551
TransformationType, *R* 549
TransformingPermutations, *R* 758
TransformingPermutationsCharacterTables, *R* 758
transitive, *R* 402
TransitiveClosureBinaryRelation, *R* 312
TransitiveGroup, *R* 514
TransitiveIdentification, *R* 514
Transitive Permutation Groups, *R* 514
transitive relation, *R* 311
Transitivity, for characters, *R* 773
 for class functions, *R* 773
 for group actions, *R* 402
TranslatorSubalgebra, *R* 633
transporter, *R* 398
TransposedMat, *R* 223
TransposedMatAttr, *R* 223
TransposedMatDestructive, *R* 224
TransposedMatImmutable, *R* 223
TransposedMatMutable, *R* 223
TransposedMatOp, *R* 223
TransposedMatrixGroup, *R* 425
Transversal, *N* 19
TransversalBySiftFunction, *N* 18
TransversalByTrivial, *N* 18
TransversalElt, *N* 16
TransversalOfChainSubgroup, *N* 20
Transversals, *R* 353
Transversals by direct products, *N* 18
Transversals by homomorphic images, *N* 17
Transversals by Schreier tree, *N* 16
Transversals by sift functions, *N* 18
Transversals by Trivial subgroups, *N* 18
Triangular Matrices, *R* 230
TriangulizedIntegerMat, *R* 237
TriangulizedIntegerMatTransform, *R* 237
TriangulizedNullspaceMat, *R* 225
TriangulizedNullspaceMatDestructive, *R* 225
TriangulizeIntegerMat, *R* 237
TriangulizeMat, *R* 225
Trivial chain subgroups and sift function chain subgroups, *N* 21
TrivialCharacter, *R* 769
TrivialGroup, *R* 506
TrivialIterator, *R* 275

TrivialSubalgebra, R 615
TrivialSubgroup, R 358
TrivialSubmagmaWithOne, R 320
TrivialSubmodule, R 569
TrivialSubmonoid, R 540
TrivialSubnearAdditiveMagmaWithZero, R 554
TrivialSubspace, R 594
TryCosetTableInWholeGroup, R 466
TryGcdCancelExtRepPolynomials, R 685
TryNextMethod, P 13, T 74
Tuples, R 148
tuple stabilizer, R 397
TwoClosure, R 422
TwoCoboundaries, R 454
TwoCocycles, R 454
TwoCohomology, R 454
TwoGroup library, R 516
TwoSidedIdeal, R 558
TwoSidedIdealByGenerators, R 559
TwoSidedIdealNC, R 559
TwoSquares, R 141
type, boolean, R 166
 cyclotomic, R 154
 records, R 257
 strings, R 245
TypeObj, R 124
TypeOfDefaultGeneralMapping, R 309
Types, R 124
TzEliminate, R 488
TzFindCyclicJoins, R 489
TzGo, R 486
TzGoGo, R 487
TzImagesOldGens, R 494
TzInitGeneratorImages, R 493
TzNewGenerator, R 485
TzOptions, R 498
TzPreImagesNewGens, R 494
TzPrint, R 484
TzPrintGeneratorImages, R 494
TzPrintGenerators, R 483
TzPrintLengths, R 484
TzPrintOptions, R 499
TzPrintPairs, R 484
TzPrintPresentation, R 484
TzPrintRelators, R 483
TzPrintStatus, R 484
TzSearch, R 488
TzSearchEqual, R 489
TzSort, R 477
TzSubstitute, R 490
TzSubstituteCyclicJoins, R 493
U
 u_N , R 159
UglyVector, R 607
Umlauts, E 26
Unbind, R 44
 for lists, R 175
UnbindElmWPObj, E 52
UnbindGlobal, R 45
UnderlyingCharacteristic, R 732
UnderlyingCharacterTable, R 763
UnderlyingElement, fp group elements, R 461
 fp semigroup elements, R 546
UnderlyingElementOfReesMatrixSemigroup-
 Element, R 539
UnderlyingElementOfReesZeroMatrixSemigroup-
 Element, R 539
UnderlyingExternalSet, R 406
UnderlyingFamily, R 635
UnderlyingGeneralMapping, R 302
UnderlyingGroup, for character tables, R 725
 for tables of marks, R 704
UnderlyingLeftModule, R 597
UnderlyingLieAlgebra, R 641
UnderlyingMagma, R 658
UnderlyingRelation, R 302
Undocumented Variables, E 33
UnInstallCharReadHookFunc, R 106
Union, R 271
 union, of collections, R 271
 of sets, R 193
Union2, R 271
UnionBlist, R 207
Unique, R 195
UniteBlist, R 208
UniteBlistList, R 208
UniteSet, R 193
Units, R 562
 Units and Factorizations, R 562
UnivariatenessTestRationalFunction, R 669
UnivariatePolynomial, R 668
UnivariatePolynomialByCoefficients, R 668
UnivariatePolynomialRing, R 677
 Univariate Polynomial Rings, R 677
Univariate Polynomials, R 668

UnivariateRationalFunctionByCoefficients, R 674
Univariate Rational Functions, R 674
UniversalEnvelopingAlgebra, R 647
Universal Enveloping Algebras, R 647
UNIX, features, R 27
 options, R 27
UNIXSelect, R 97
Unknown, R 164
UnloadSmallGroupsData, R 517
UnorderedTuples, R 147
Unpacking, R 825
UnprofileFunctions, R 82
UnprofileMethods, R 82
until, R 52
UntraceMethods, R 78
UpdateMap, R 806
UpEnv, R 71
UpperCentralSeriesOfGroup, R 367
UpperSubdiagonal, R 230
Usage of the Percent Symbol, E 24
UseBasis, R 571
UseFactorRelation, R 293
Useful Categories for all Elements of a Family, R 297
Useful Categories of Elements, R 295
UseIsomorphismRelation, R 293
User Streams, R 103
UseSubsetRelation, R 293
Using buildman.pe, E 27
utilities for editing GAP files, R 75

V

v, (global) Variable mark-up, E 16
 v_N , R 159
Valuation, R 688
Value, R 671
ValueCochain, R 650
ValueGlobal, R 45
ValueMolienSeries, R 786
ValueOption, R 88
ValuePol, R 216
ValuesOfClassFunction, R 763
Variable Access in a Break Loop, R 71
Variables, R 43
variables, T 22
vectors, row, T 36
Vectors and Matrices, T 36
Vectors as coefficients of polynomials, R 215

VectorSpace, R 593
VectorSpaceByPcgsOfElementaryAbelianGroup, R 445
Vector Space Homomorphisms, R 604
Vector Spaces, T 59
Vector Spaces Handled By Nice Bases, R 606
verbatim environments, E 22
Version Numbers, E 40
vi, R 75
View, R 65
View and Print, R 65
ViewObj, R 66
 for character tables, R 741
 for class functions, R 767
 for tables of marks, R 700
vim, R 75
VirtualCharacter, R 768
virtual character, R 770
virtual characters, R 761

W

w_N , R 159
WeakPointerObj, E 51
WeakPointerObj, E 51
Weak Pointer Objects, E 51
web sites, for GAP, T 16
WedgeGModule, R 691
WeekDay, R 255
WeightLexOrdering, R 279
WeightOfGenerators, R 280
WeightsTom, R 706
WeightVecFFE, R 215
WeylGroup, R 643
WeylOrbitIterator, R 644
Where, R 70, T 86
While, R 52
while loop, R 52
whitespace, T 19
Whitespaces, R 41
Why Class Functions?, R 761
Why Proceed in a Different Way?, P 45
WordAlp, R 250
words, in generators, R 349
Working with large degree permutation groups,
 R 423
Wrapping Up a GAP Package, E 41
WreathProduct, R 503
wreath product embedding, R 504

`WreathProductImprimitiveAction`, R 504
`WreathProductOrdering`, R 281
`WreathProductProductAction`, R 504
Wreath Products, *R* 503
`WriteAll`, R 100
`WriteByte`, R 100
`WriteLine`, R 100
Writing Documentation, *E* 36
Writing Functions, *T* 40

X

`X`, T 79
 x_N , R 159

Y

y_N , R 159

Z

`Z`, R 578
`ZClassRepsQClass`, R 429

`Zero`, R 289
`ZeroAttr`, R 289
`ZeroCoefficient`, R 659
`ZeroCoefficientRatFun`, R 683
`ZeroImmutable`, R 289
`ZeroMapping`, R 301
`ZeroMutable`, R 289
`ZeroOp`, R 289
`ZeroSameMutability`, R 289
`ZeroSM`, R 289
`ZippedProduct`, R 685
`ZippedSum`, R 685
`ZmodnZ`, R 134
`ZmodnZObj`, R 134
`ZmodpZ`, R 134
`ZmodpZNC`, R 134
`zoo`, E 41
`ZumbroichBase`, R 589
`Zuppos`, R 372