

Index

- 5th postulate, 129
addition of vectors, 132
additivity of dot product, 114
altitude of cone, 77
altitude of cylinder, 76
altitude of frustum, 32
altitude of prism, 30
altitude of pyramid, 31
altitude of spherical segment, 91
angle between line and plane, 21
angle between lines, 20
angle between planes, 18
angle between skew lines, 20
angle on hyperbolic plane, 150
antiprism, 72, 74
apothem, 32
Archimedean solids, 72
Archimedes' axiom, 131
area, 152
area of sphere, 93
area of spherical frustum, 93
area of spherical segment, 93
associative, 109
associativity, 111, 120
axial cross section, 86
axiom, 128, 132
axiom of completeness, 131
axiom of dimension, 134
axioms of order, 130
axis of revolution, 75
axis of symmetry, 61

ball, 88
barycenter, 119
base of cone, 77
base of conical frustum, 78
base of cylinder, 76

base of prism, 30
base of pyramid, 31
base of spherical frustum, 91
base of spherical sector, 96
base of spherical segment, 91
bases of frustum, 32
bilateral symmetry, 61
bilinearity, 137
box, 31

Cartesian coordinate system, 141
Cartesian projection, 20
Cauchy-Schwarz inequality, 138
Cavalieri's principle, 45
center, 88
center of homothety, 52
center of mass, 119
center of symmetry, 59
central symmetry, 59
Ceva's theorem, 122
circle, 161
circumscribed prism, 77
circumscribed pyramid, 78
circumscribed sphere, 103
collinear, 123
common notion, 128
commutative, 109
composition, 138, 154
concurrent, 37
cone, 77
congruent dihedral angles, 17
congruent figures, 129, 138
conical frustum, 78
conical surface, 77
consistency, 144
convex polyhedral angle, 23
convex polyhedron, 29
coordinate Euclidean space, 142

- coordinates, 141
 cube, 31
 cuboid, 31
 curved surface, 78
 cylinder, 76
 cylindrical surface, 76
 definition, 128
 Desargues' theorem, 127
 development, 81
 diagonal of polyhedron, 29
 diagonal plane, 31
 diameter, 88
 difference of vectors, 111
 dihedral angle, 16
 dimension (of space), 133
 dimensions (of box), 31
 directed segment, 107
 directrix, 76, 77
 distance from point to plane, 12
 distributivity, 110, 111
 dodecahedron, 67
 dome, 91
 dot product, 112
 doubling the cube, 59
 edge of dihedral angle, 16
 edge of half-plane, 16
 edge of polyhedral angle, 23
 edge of polyhedron, 29
 element, 131
 elliptic, 160
 equal vectors, 108
 equation of plane, 153
 equivalent, 35, 39
 Euclidean inner product, 137
 Euclidean vector space, 137
 Euler's line, 118
 exterior, 16
 face of dihedral angle, 16
 face of polyhedral angle, 23
 face of polyhedron, 29
 fixed point, 156
 foot of perpendicular, 11
 foot of slant, 11
 frustum of pyramid, 32
 generator, 75, 76
 generatrix, 75–77
 great circle, 89
 greater dihedral angle, 17
 half-plane, 16
 head of directed segment, 107
 hemisphere, 89
 hexahedron, 67
 higher order symmetry, 63
 Hilbert's 3rd Problem, 48
 Hilbert's axioms, 130
 homogeneity of dot product, 114
 homologous, 51
 homothetic figures, 52
 homothety, 52
 homothety coefficient, 52
 hyperbola, 148
 hyperbolic, 160
 hyperbolic plane, 149
 hyperbolic rotation, 159
 hyperboloid, 149
 hyperboloid model, 149
 icosahedron, 67
 identity, 154
 inner product, 137
 inscribed prism, 77
 inscribed pyramid, 78
 inscribed sphere, 103
 interior, 16
 inverse, 154
 isometry, 138, 154
 Klein model, 143
 lateral edge of prism, 30
 lateral edge of pyramid, 31
 lateral face of prism, 30
 lateral face of pyramid, 31
 lateral surface, 91
 lateral surface area, 35, 78
 lateral surface of cone, 77
 lateral surface of cylinder, 76
 length, 151
 lie between, 130
 light cone, 148
 light-like vector, 148
 line, 128, 134
 line of centers, 103

- line perpendicular to plane, 10
linear angle, 16
linear combination, 133
linearly dependent, 133
linearly independent, 133
lune, 145

mass, 119
material point, 119
measure of polyhedral angle, 105
measure of solid angle, 105
Menelaus' theorem, 124
meridian, 76
meridional, 76
Minkowski inner product, 147
Minkowski space, 147, 148
multiplication, 110
multiplication by scalars, 132

net, 81, 82
net of cone, 83
net of conical frustum, 83
net of cylinder, 82
non-Euclidean geometries, 129

oblique, 11
oblique cylinder, 76
oblique prism, 30
octahedron, 67
opposite vector, 132
opposite vectors, 111
order of symmetry, 63
origin, 111, 134
orthogonal projection, 20
orthogonal vectors, 148

Pappus' theorem, 127
parabolic, 160
parallel line and plane, 4
parallel planes, 5
parallel postulate, 129
parallelepiped, 31
pentahedral angle, 23
perpendicular, 10
perpendicular cross section, 35
perpendicular lines, 20
perpendicular planes, 19
plane, 134
plane angle, 23

plane of symmetry, 60
plane perpendicular to line, 10
plane surface, 128
Platonic solids, 67
point, 128, 134
polyhedral angle, 23
polyhedron, 29
postulate, 128
prism, 29, 30
product of scalar and vector, 110
projection, 20
projection of figure, 20
projection of slant, 12
projective geometry, 126
projective plane, 146
proportional vectors, 110
proposition, 129
pseudo-mass, 119
pyramid, 31
pyramidal frustum, 32

quadrangular prism, 30
quadrangular pyramid, 32

radius, 88
radius-vector, 111, 134
rectangular parallelepiped, 31
reflection, 155, 157
regrouping, 120
regular polyhedral angle, 66
regular polyhedron, 66
regular prism, 30
regular pyramid, 32
regular pyramidal frustum, 32
regular tetrahedron, 67
relation, 130
represent the same vector, 108
Riemann surface, 160
right circular cone, 77
right circular cylinder, 76
right cylinder, 76
right dihedral angle, 17
right prism, 30
rotation, 155

scalar, 132
scalar product, 112
scissors-congruent, 48

- set, 131
set of real numbers, 131
signed projection, 113
similar, 56
similar cones, 84
similar cylinders, 84
similar figures, 56
similar polyhedra, 51
skew lines, 4
slant, 11
slant to plane, 11
smaller dihedral angle, 17
solid angle, 102
solid geometry, 1
space-like vector, 148
sphere, 88
spherical frustum, 91
spherical geometry, 144
spherical lune, 145
spherical model, 146
spherical sector, 96
spherical segment, 91
spherical surface, 88
stereometry, 1
straight line, 128
subset, 131
subspace, 133
sum of vectors, 108
supplementary dihedral angles, 17
surface, 128
surface area, 35
surface of revolution, 75
symmetric figures, 139
symmetric polyhedral angles, 26
symmetry, 137
symmetry of dot product, 114
symmetry about line, 61
symmetry about plane, 60
- tail of directed segment, 107
tangent balls, 103
tangent cones, 86
tangent line, 91
tangent plane, 86, 90
tangent spheres, 103
test for perpendicular planes, 19
tetrahedral angle, 23
tetrahedron, 32
- three perpendiculars, 13
time-like vector, 148
total surface area, 79–81
translation, 54, 134, 155
triangle inequality, 140
triangular prism, 30
triangular pyramid, 32
trihedral angle, 23
- undefinable notions, 130
unit dihedral angle, 18
unit vector, 113, 141
- vector, 108, 132
vector space, 132
vertex, 77
vertex of polyhedral angle, 23
vertex of polyhedron, 29
vertex of pyramid, 31
vertex of solid angle, 102
vertical dihedral angles, 17
vertical polyhedral angles, 26
volume, 39
volume of ball, 99
volume of cone, 83
volume of conical frustum, 83
volume of cylinder, 83
volume of prism, 44
volume of spherical sector, 98
- weighted sum, 120
- zero vector, 110
zone, 91