

Geometry Mastery — 100 Essential Problems

COMPLETE GEOMETRY REVIEW · ALL UNITS · PROGRESSIVE DIFFICULTY

✓ Correct: 0 ✗ Wrong: 0 Score: —

LINES & ANGLES

01 LINES & ANGLES

EASY

A point has no length, width, or height. How many dimensions does a point have?

A 0

B 1

C 2

D 3

02 LINES & ANGLES

EASY

Two lines that never intersect and are in the same plane are called:

A Perpendicular

B Skew

C Parallel

D Intersecting

03 LINES & ANGLES

EASY

An angle that measures exactly 90° is called:

A Acute

B Obtuse

C Right

D Straight

04 LINES & ANGLES

EASY

An angle measuring between 0° and 90° is called:

- A Obtuse
- B Right
- C Straight
- D Acute

05 LINES & ANGLES

EASY

If two angles are supplementary, their measures add up to:

- A 45°
- B 90°
- C 180°
- D 360°

06 LINES & ANGLES

EASY

If two angles are complementary, their measures add up to:

- A 45°
- B 90°
- C 180°
- D 360°

07 LINES & ANGLES

EASY

A straight angle measures:

- A 90°
- B 120°
- C 180°
- D 360°

08 LINES & ANGLES

EASY

Vertical angles are formed when two lines intersect. They are always:

- A Supplementary
- B Complementary
- C Congruent
- D Adjacent

09 LINES & ANGLES

MEDIUM

Line m is parallel to line n . A transversal crosses both. Alternate interior angles are:

- A Supplementary
- B Equal
- C Complementary
- D Unrelated

10 LINES & ANGLES

MEDIUM

A transversal crosses two parallel lines. Co-interior (same-side interior) angles add up to:

- A 90°
- B 180°
- C 270°
- D 360°

TRIANGLES

11 TRIANGLES

EASY

The sum of the interior angles of any triangle is:

- A 90°
- B 180°
- C 270°
- D 360°

12 TRIANGLES

EASY

An equilateral triangle has three equal sides. Each interior angle measures:

A 45°

B 60°

C 72°

D 90°

13 TRIANGLES

EASY

A triangle with one 90° angle is called:

A Acute

B Obtuse

C Right

D Equiangular

14 TRIANGLES

EASY

In a right triangle with legs 3 and 4, the hypotenuse is:

A 5

B 6

C 7

D $\sqrt{7}$

15 TRIANGLES

EASY

An isosceles triangle has:

A No equal sides

B Exactly 2 equal sides

C 3 equal sides

D No equal angles

16 TRIANGLES

MEDIUM

In a triangle, angles are 50° , 70° , and x° . Find x .

A 50° B 60° C 70° D 80°

17 TRIANGLES

MEDIUM

The exterior angle of a triangle equals:

A The adjacent interior angle

B The sum of the two non-adjacent interior angles

C 180° minus all interior anglesD 90°

18 TRIANGLES

MEDIUM

Which set of lengths can form a triangle?

A 1, 2, 3

B 2, 2, 5

C 3, 4, 5

D 1, 1, 3

19 TRIANGLES

MEDIUM

A right triangle has legs a and b and hypotenuse c . Which equation is correct?

A $a + b = c$ B $a^2 + b^2 = c^2$ C $a^2 - b^2 = c^2$ D $(a+b)^2 = c$

20 TRIANGLES

MEDIUM

An isosceles triangle has a vertex angle of 40° . The base angles each measure:

A 40° B 60° C 70° D 80°

21 TRIANGLES

HARD

In right triangle ABC, the altitude from the right angle to the hypotenuse has length h . If the two segments of the hypotenuse are p and q , then:

A $h = p + q$ B $h^2 = pq$ C $h = (p+q)/2$ D $h^2 = p^2 + q^2$

22 TRIANGLES

HARD

The medians of a triangle meet at the centroid. The centroid divides each median in ratio:

A 1:1

B 1:2

C 2:1

D 3:1

CONGRUENCE & SIMILARITY

23 CONGRUENCE & SIMILARITY

EASY

Two figures are congruent if they have the same:

A Shape only

B Size only

C Shape and size

D Color

24 CONGRUENCE & SIMILARITY

EASY

SSS congruence means two triangles are congruent if:

- A Three angles are equal
- B Three sides are equal
- C Two sides and the included angle are equal
- D Two angles and a side are equal

25 CONGRUENCE & SIMILARITY

EASY

Two triangles are similar if they have the same:

- A Size only
- B Shape only
- C Shape and size
- D Area

26 CONGRUENCE & SIMILARITY

MEDIUM

Triangle $ABC \sim$ Triangle DEF . $AB = 4$, $DE = 6$, $BC = 5$. Find EF .

- A 5
- B 7
- C 7.5
- D 8

27 CONGRUENCE & SIMILARITY

MEDIUM

Which congruence shortcut does NOT apply to all triangles?

- A SSS
- B SAS
- C ASA
- D SSA

28 CONGRUENCE & SIMILARITY

MEDIUM

If two triangles are similar with a scale factor of 3:1, the ratio of their areas is:

A 3:1

B 6:1

C 9:1

D 27:1

29 CONGRUENCE & SIMILARITY

HARD

In triangle ABC, D is on AB and E is on AC, with $DE \parallel BC$. If $AD = 3$, $DB = 6$, and $DE = 4$, find BC.

A 8

B 10

C 12

D 14

QUADRILATERALS

30 QUADRILATERALS

EASY

The sum of interior angles of any quadrilateral is:

A 180°

B 270°

C 360°

D 540°

31 QUADRILATERALS

EASY

A parallelogram has opposite sides that are:

A Perpendicular

B Equal and parallel

C Unequal

D Not parallel

32 QUADRILATERALS

EASY

A rectangle is a parallelogram with:

- A All sides equal
- B All angles equal to 90°
- C One pair of parallel sides
- D Diagonals bisecting at 90°

33 QUADRILATERALS

EASY

A rhombus has:

- A All angles 90°
- B All sides equal
- C Unequal diagonals that are perpendicular
- D No equal sides

34 QUADRILATERALS

MEDIUM

In a parallelogram, opposite angles are:

- A Supplementary
- B Complementary
- C Equal
- D Right angles

35 QUADRILATERALS

MEDIUM

A trapezoid has exactly one pair of parallel sides. The midsegment of a trapezoid has length equal to:

- A The sum of parallel sides
- B The difference of parallel sides
- C The average of the parallel sides
- D The product of parallel sides

36 QUADRILATERALS

MEDIUM

The diagonals of a rectangle:

- A Are perpendicular
- B Bisect each other and are equal
- C Are not equal
- D Bisect the angles

37 QUADRILATERALS

HARD

Quadrilateral ABCD has vertices A(0,0), B(4,0), C(4,3), D(0,3). What is it?

- A Rhombus
- B Trapezoid
- C Rectangle
- D Parallelogram only

POLYGONS

38 POLYGONS

EASY

The sum of interior angles of a pentagon (5 sides) is:

- A 360°
- B 450°
- C 540°
- D 720°

39 POLYGONS

EASY

The sum of interior angles of a hexagon (6 sides) is:

- A 540°
- B 720°
- C 900°
- D 1080°

40

POLYGONS

EASY

Each exterior angle of a regular polygon always sums to:

A 180° B 270° C 360° D 720°

41

POLYGONS

MEDIUM

A regular polygon has an exterior angle of 45° . How many sides does it have?

A 6

B 7

C 8

D 9

42

POLYGONS

MEDIUM

Each interior angle of a regular hexagon measures:

A 108° B 120° C 135° D 144°

43

POLYGONS

MEDIUM

How many diagonals does a pentagon have?

A 3

B 4

C 5

D 6

44 POLYGONS

HARD

Each interior angle of a regular polygon is 150° . How many sides does it have?

A 10

B 12

C 15

D 18

CIRCLES

45 CIRCLES

EASY

The distance from the center of a circle to any point on the circle is called the:

A Diameter

B Radius

C Chord

D Arc

46 CIRCLES

EASY

The diameter of a circle with radius 7 is:

A 3.5

B 7

C 14

D 21

47 CIRCLES

EASY

The circumference of a circle with radius r is:

A πr B $2\pi r$ C πr^2 D $2\pi r^2$

48 CIRCLES

EASY

The area of a circle with radius r is:

A πr B $2\pi r$ C πr^2 D $4\pi r^2$

49 CIRCLES

MEDIUM

A central angle of a circle equals the measure of the arc it intercepts. A central angle of 90° intercepts an arc that is what fraction of the circle?

A $1/6$ B $1/4$ C $1/3$ D $1/2$

50 CIRCLES

MEDIUM

An inscribed angle equals half the central angle that intercepts the same arc. A central angle is 80° . The inscribed angle on the same arc is:

A 20° B 40° C 80° D 160°

51 CIRCLES

MEDIUM

A tangent to a circle at a point is perpendicular to the radius at that point. If the radius is 5 and the tangent length from an external point to the tangency point is 12, the distance from the external point to the center is:

A 13

B 14

C 15

D 17

52 CIRCLES

MEDIUM

Two chords intersect inside a circle. If the segments of one chord are 3 and 8, and one segment of the other chord is 4, the other segment is:

A 4

B 6

C 7

D 8

53 CIRCLES

HARD

A sector of a circle has a central angle of 60° and radius 6. Its area is:

A 3π B 6π C 9π D 12π

54 CIRCLES

HARD

The arc length of a sector with central angle 120° and radius 9 is:

A 3π B 6π C 9π D 12π

AREA & PERIMETER

55 AREA & PERIMETER

EASY

The area of a rectangle with length 8 and width 5 is:

A 13

B 26

C 40

D 80

56

AREA & PERIMETER

EASY

The area of a triangle with base 10 and height 6 is:

A 30B 60C 16D 32

57

AREA & PERIMETER

EASY

The perimeter of a regular hexagon with side length 5 is:

A 25B 30C 36D 42

58

AREA & PERIMETER

EASY

The area of a square with side 7 is:

A 28B 42C 49D 56

59

AREA & PERIMETER

MEDIUM

A parallelogram has base 12 and height 5. Its area is:

A 17B 30C 60D 85

60

AREA & PERIMETER

MEDIUM

A trapezoid has parallel sides of 6 and 10 and a height of 4. Its area is:

A 24

B 32

C 40

D 64

61

AREA & PERIMETER

MEDIUM

A circle has diameter 10. Its area is:

A 10π B 25π C 50π D 100π

62

AREA & PERIMETER

MEDIUM

A square has area 81. Its perimeter is:

A 18

B 27

C 36

D 45

63

AREA & PERIMETER

HARD

A rhombus has diagonals of 10 and 24. Its area is:

A 60

B 120

C 240

D 480

64

AREA & PERIMETER

HARD

A right triangle has legs 5 and 12. What is its perimeter?

A 17

B 25

C 30

D 34

COORDINATE GEOMETRY

65

COORDINATE GEOMETRY

EASY

The distance between points (0,0) and (3,4) is:

A 3

B 4

C 5

D 7

66

COORDINATE GEOMETRY

EASY

The midpoint of segment from (2,4) to (8,10) is:

A (4,6)

B (5,7)

C (6,8)

D (3,5)

67

COORDINATE GEOMETRY

EASY

The slope of a line through (1,2) and (3,6) is:

A 1

B 2

C 3

D 4

68 COORDINATE GEOMETRY

MEDIUM

Two lines are perpendicular. One has slope 3. The other has slope:

A 3

B -3

C $\frac{1}{3}$ D $-\frac{1}{3}$

69 COORDINATE GEOMETRY

MEDIUM

A line with slope 2 passes through (1, 3). Its equation is:

A $y = 2x + 1$ B $y = 2x + 3$ C $y = 2x - 2$ D $y = x + 2$

70 COORDINATE GEOMETRY

MEDIUM

The slope of a horizontal line is:

A Undefined

B 1

C -1

D 0

71 COORDINATE GEOMETRY

MEDIUM

The distance between (1,1) and (4,5) is:

A 4

B 5

C 7

D $\sqrt{7}$

72 COORDINATE GEOMETRY

HARD

Find the area of the triangle with vertices A(0,0), B(4,0), and C(0,3).

A 3

B 6

C 7

D 12

73 COORDINATE GEOMETRY

HARD

Line 1: $y = 2x + 1$. Line 2: $y = 2x - 3$. These lines are:

A Perpendicular

B Intersecting

C Parallel

D The same line

TRANSFORMATIONS

74 TRANSFORMATIONS

EASY

A transformation that slides every point the same distance in the same direction is called:

A Rotation

B Reflection

C Translation

D Dilation

75 TRANSFORMATIONS

EASY

A transformation that flips a figure over a line is called:

A Translation

B Rotation

C Reflection

D Dilation

76 TRANSFORMATIONS

EASY

A dilation with scale factor 2 makes the figure:

- A Half as large
- B Twice as large
- C Unchanged
- D Rotated

77 TRANSFORMATIONS

MEDIUM

Point A(3, 4) is reflected over the x-axis. Its image is:

- A (-3,4)
- B (3,-4)
- C (-3,-4)
- D (4,3)

78 TRANSFORMATIONS

MEDIUM

Point B(2,5) is reflected over the y-axis. Its image is:

- A (-2,5)
- B (2,-5)
- C (-2,-5)
- D (5,2)

79 TRANSFORMATIONS

MEDIUM

A rotation of 180° about the origin maps (x, y) to:

- A (y, x)
- B $(-x, y)$
- C $(x, -y)$
- D $(-x, -y)$

80 TRANSFORMATIONS

HARD

A 90° counterclockwise rotation about the origin maps (x, y) to:

A (y, x) B $(-y, x)$ C $(y, -x)$ D $(-x, -y)$

SOLID GEOMETRY

81 SOLID GEOMETRY

EASY

The volume of a rectangular prism with length 4, width 3, and height 5 is:

A 24

B 47

C 60

D 120

82 SOLID GEOMETRY

EASY

The volume of a cube with side 4 is:

A 16

B 24

C 48

D 64

83 SOLID GEOMETRY

EASY

The surface area of a cube with side s is:

A s^2 B $4s^2$ C $6s^2$ D $12s^2$

84

SOLID GEOMETRY

EASY

The volume of a cylinder with radius r and height h is:

A πrh

B $2\pi rh$

C $\pi r^2 h$

D $2\pi r^2 h$

85

SOLID GEOMETRY

MEDIUM

A sphere has radius 3. Its volume is:

A 12π

B 36π

C 108π

D 144π

86

SOLID GEOMETRY

MEDIUM

A cone has radius 3 and height 4. Its volume is:

A 12π

B 16π

C 36π

D 48π

87

SOLID GEOMETRY

MEDIUM

The surface area of a sphere with radius 5 is:

A 25π

B 50π

C 75π

D 100π

88 SOLID GEOMETRY

MEDIUM

A cylinder has radius 2 and height 6. Its volume is:

- A 12π
- B 24π
- C 36π
- D 48π

89 SOLID GEOMETRY

HARD

A rectangular pyramid has a base 6×6 and height 4. Its volume is:

- A 48
- B 72
- C 96
- D 144

90 SOLID GEOMETRY

HARD

If the radius of a sphere doubles, its volume becomes:

- A Twice as large
- B 4 times as large
- C 6 times as large
- D 8 times as large

PROOFS & LOGIC

91 PROOFS & LOGIC

EASY

A statement and its converse swap the "if" and "then" parts. The converse of "If it rains, the ground is wet" is:

- A If it does not rain, the ground is dry
- B If the ground is wet, it rains
- C If the ground is dry, it does not rain
- D Rain causes wet ground

92 PROOFS & LOGIC

EASY

The contrapositive of "If p , then q " is:

- A If q , then p
- B If not p , then not q
- C If not q , then not p
- D If p , then not q

93 PROOFS & LOGIC

MEDIUM

In a two-column proof, each statement must be justified by a:

- A Guess
- B Reason (definition, theorem, or property)
- C Previous conclusion only
- D Diagram

94 PROOFS & LOGIC

MEDIUM

The reflexive property of equality states:

- A $a = b$ implies $b = a$
- B $a = a$
- C If $a = b$ and $b = c$, then $a = c$
- D $a + b = b + a$

95 PROOFS & LOGIC

MEDIUM

Which theorem states: "If two parallel lines are cut by a transversal, corresponding angles are equal"?

- A Alternate Interior Angles Theorem
- B Corresponding Angles Postulate
- C Consecutive Angles Theorem
- D Vertical Angles Theorem

96

SPECIAL TRIANGLES & TRIG

EASY

In a 45-45-90 triangle, the hypotenuse is equal to a leg multiplied by:

A $\sqrt{2}$

B $\sqrt{3}$

C 2

D $2\sqrt{3}$

97

SPECIAL TRIANGLES & TRIG

EASY

In a 30-60-90 triangle, the sides are in ratio:

A $1:1:\sqrt{2}$

B $1:\sqrt{2}:2$

C $1:\sqrt{3}:2$

D $\sqrt{2}:\sqrt{3}:2$

98

SPECIAL TRIANGLES & TRIG

MEDIUM

In right triangle ABC with angle A = 30°, hypotenuse = 10. The side opposite A is:

A 5

B $5\sqrt{3}$

C $10\sqrt{2}$

D $10\sqrt{3}$

99

SPECIAL TRIANGLES & TRIG

MEDIUM

In a right triangle, $\sin(\theta)$ equals:

A adjacent/hypotenuse

B opposite/hypotenuse

C opposite/adjacent

D hypotenuse/opposite

100 SPECIAL TRIANGLES & TRIG

MEDIUM

In a right triangle, $\tan(\theta)$ equals:

- A adjacent/hypotenuse
- B opposite/hypotenuse
- C opposite/adjacent
- D hypotenuse/adjacent

101 SPECIAL TRIANGLES & TRIG

HARD

A ladder 13 feet long leans against a wall. The base is 5 feet from the wall. How high up the wall does it reach?

- A 8
- B 10
- C 12
- D $\sqrt{194}$

102 SPECIAL TRIANGLES & TRIG

HARD

In a 30-60-90 triangle, the short leg is 4. The hypotenuse is:

- A $4\sqrt{2}$
- B $4\sqrt{3}$
- C 8
- D $8\sqrt{3}$

CONSTRUCTIONS & LOCI

103 CONSTRUCTIONS & LOCI

EASY

The perpendicular bisector of a segment is the locus of points equidistant from:

- A Both endpoints
- B The midpoint only
- C One endpoint
- D The center

104 CONSTRUCTIONS & LOCI

EASY

The angle bisector of an angle is the locus of points equidistant from the:

- A Vertex
- B Two sides of the angle
- C Midpoint of the angle
- D Center of the opposite side

105 CONSTRUCTIONS & LOCI

MEDIUM

The circumscribed circle of a triangle passes through all three vertices. Its center is the:

- A Centroid
- B Incenter
- C Circumcenter
- D Orthocenter

106 CONSTRUCTIONS & LOCI

MEDIUM

The inscribed circle of a triangle is tangent to all three sides. Its center is the:

- A Centroid
- B Incenter
- C Circumcenter
- D Orthocenter

MIXED CHALLENGE

107 MIXED CHALLENGE

MEDIUM

A 10-foot shadow is cast by a 5-foot person. At the same time, a tree casts a 40-foot shadow. How tall is the tree?

- A 15 ft
- B 20 ft
- C 25 ft
- D 30 ft

108 MIXED CHALLENGE

MEDIUM

A circle is inscribed in a square with side 8. The area of the circle is:

A 8π B 16π C 32π D 64π

109 MIXED CHALLENGE

MEDIUM

If a triangle has sides 5, 5, and 6, what is its area?

A 12

B 15

C 18

D 24

110 MIXED CHALLENGE

HARD

The legs of a right triangle are in ratio 3:4. The hypotenuse is 15. Find the longer leg.

A 9

B 12

C 15

D 20

111 MIXED CHALLENGE

HARD

A rectangular garden is 3 meters longer than it is wide. Its area is 40 m^2 . What is its width?

A 4 m

B 5 m

C 6 m

D 8 m

112 MIXED CHALLENGE

HARD

In circle O, chord $AB = 16$. The perpendicular distance from the center to AB is 6. Find the radius.

A 8

B 10

C 12

D 14

113 MIXED CHALLENGE

HARD

Triangle ABC is a right triangle with the right angle at C . Altitude CD is drawn to hypotenuse AB . If $AD = 4$ and $DB = 9$, find CD .

A 3

B 6

C 13

D $\sqrt{13}$

114 MIXED CHALLENGE

HARD

The perimeter of a regular octagon is 48. What is one side length?

A 4

B 5

C 6

D 8

115 MIXED CHALLENGE

HARD

The volume of a cylinder equals the volume of a cone with the same radius and height h . Which statement is true?

A The cylinder height equals h B The cylinder height equals $h/3$ C The cylinder height equals $3h$

D They cannot have equal volumes

What is the diagonal length of a rectangular prism with dimensions 2, 3, and 6?

A 7

B 8

C 9

D 11

Answer Key

1. A	2. C	3. C	4. D	5. C
6. B	7. C	8. C	9. B	10. B
11. B	12. B	13. C	14. A	15. B
16. B	17. B	18. C	19. B	20. C
21. B	22. C	23. C	24. B	25. B
26. C	27. D	28. C	29. C	30. C
31. B	32. B	33. B	34. C	35. C
36. B	37. C	38. C	39. B	40. C
41. C	42. B	43. C	44. B	45. B
46. C	47. B	48. C	49. B	50. B
51. A	52. B	53. B	54. B	55. C
56. A	57. B	58. C	59. C	60. B
61. B	62. C	63. B	64. C	65. C
66. B	67. B	68. D	69. A	70. D
71. B	72. B	73. C	74. C	75. C
76. B	77. B	78. A	79. D	80. B
81. C	82. D	83. C	84. C	85. B
86. A	87. D	88. B	89. A	90. D
91. B	92. C	93. B	94. B	95. B
96. A	97. C	98. A	99. B	100. C
101. C	102. C	103. A	104. B	105. C
106. B	107. B	108. B	109. A	110. B
111. B	112. B	113. B	114. C	115. B
116. A				