

Math Practice Worksheet

Algebra 2 · Geometry 2 | Self-Study Edition

PART A — Algebra 2

Q1 [Quadratic Functions — Vertex Form]

The parabola $y = 2(x - 3)^2 - 5$ has vertex at point (h, k) . What is the value of $h + k$?

KEY: $y = a(x-h)^2 + k \rightarrow \text{vertex} = (h, k)$. Watch the sign!

Answer: _____

Q2 [Quadratic Formula — Discriminant]

For $3x^2 - 6x + 3 = 0$, how many distinct real solutions exist?

KEY: Discriminant = $b^2 - 4ac$. Positive=2, Zero=1, Negative=0 solutions.

Answer: _____

Q3 [Polynomial Division — Remainder Theorem]

$f(x) = x^3 - 2x^2 + x - 4$ is divided by $(x - 2)$. What is the remainder?

KEY: Remainder = $f(c)$ when dividing by $(x - c)$. Just plug in!

Answer: _____

Q4 [Rational Expressions — Simplifying]

Simplify: $(x^2 - 9) / (x - 3)$. Write in the form $x + n$.

KEY: Factor numerator first. Cancel common factors = HOLE, not asymptote.

Answer: _____

Q5 [Exponential Functions — Growth]

A bacteria population starts at 500 and triples every hour. What is the population after 3 hours?

*KEY: $y = a * b^x$. $b > 1$ = growth. y-intercept = a.*

Answer: _____

Q6 [Logarithms — Basic Solve]

Solve for x : log base 2 of $x = 5$.

KEY: $\log_b(x) = y \Leftrightarrow b^y = x$. Swap log to exponent form!

Answer: _____

Q7 [Sequences — Geometric]

A geometric sequence: $a_1 = 4$, common ratio $r = 3$. What is the 5th term a_5 ?

*KEY: $a_n = a_1 * r^{(n-1)}$. Geometric = multiply same ratio.*

Answer: _____

Q8 [Rational Exponents]

Simplify: $27^{(2/3)}$.

KEY: $x^{(m/n)} = (n\text{-th root of } x)^m$. Denominator = root, Numerator = power.

Answer: _____

Q9 [Systems of Equations]

Solve: $y = 2x + 1$ and $3x + y = 16$. What is $x + y$?

KEY: Substitute the isolated variable. Set up, plug in, solve.

Answer: _____

Q10 [Complex Numbers]

Multiply: $(3 + 2i)(1 - i)$. What is the real part of the result?

KEY: $i^2 = -1$. Distribute, then combine real and imaginary parts.

Answer: _____

PART B — Geometry 2

Q1 [Circle — Arc Length]

A circle has radius $r = 10$. Find the arc length of a 90° central angle. Express in terms of π .

KEY: $Arc = (angle/360) \times 2\pi r$. Fraction of full circumference.

Answer: _____

Q2 [Pythagorean Theorem]

In a right triangle, one leg is 8 and the hypotenuse is 17. What is the other leg?

KEY: $a^2 + b^2 = c^2$. Hypotenuse = longest side, opposite right angle.

Answer: _____

Q3 [Similar Triangles]

Two similar triangles: the smaller has sides 3, 4, 5. The larger has shortest side = 9. What is the longest side of the larger triangle?

KEY: Corresponding sides are proportional. Find scale factor first.

Answer: _____

Q4 [Circle — Inscribed Angle]

An inscribed angle intercepts an arc of 140° . What is the measure of the inscribed angle?

KEY: $Inscribed\ angle = (1/2) \times intercepted\ arc$. $Central\ angle = full\ arc$.

Answer: _____

Q5 [Volume — Cone]

A cone has radius $r = 3$ and height $h = 4$. Find the volume in terms of π .

KEY: $V = (1/3)\pi r^2 h$. Cone = one-third of a cylinder.

Answer: _____

Q6 [Coordinate Geometry — Midpoint]

Points $A = (2, 6)$ and $B = (8, -2)$. What is the y-coordinate of the midpoint?

KEY: $M = ((x_1+x_2)/2, (y_1+y_2)/2)$. Average both coordinates.

Answer: _____

Q7 [Parallel Lines — Co-interior Angles]

Parallel lines cut by a transversal. One co-interior angle is 65° . What is the other co-interior angle?

KEY: Co-interior (same-side interior) angles are supplementary: add to 180° .

Answer: _____

Q8 [Trigonometry — SOH CAH TOA]

Right triangle: hypotenuse = 13, angle = 30° . What is the opposite side? ($\sin 30^\circ = 0.5$)

KEY: SOH: $\sin = \text{Opposite} / \text{Hypotenuse}$. Label triangle sides first!

Answer: _____

Q9 [Circle — Equation]

Circle equation: $(x - 4)^2 + (y + 1)^2 = 25$. What is the radius?

KEY: $(x-h)^2 + (y-k)^2 = r^2$. Center = (h,k) , $r = \text{sqrt of right side}$.

Answer: _____

Q10 [Surface Area — Sphere]

A sphere has radius $r = 6$. What is the surface area? Express in terms of pi.

KEY: $SA = 4\pi r^2$. Volume = $(4/3)\pi r^3$. Remember 'Four-Four-Three'.

Answer: _____

ANSWER KEY

Q#	Answer	Q#	Answer
A1	-2	G1	5π
A2	1 solution	G2	15
A3	-2	G3	15
A4	$x + 3$	G4	70°
A5	13,500	G5	12π
A6	32	G6	2
A7	324	G7	115°
A8	9	G8	6.5
A9	10	G9	5
A10	5	G10	144π

Note: Answers with 'pi' represent exact values (e.g. $5\pi = 5\pi$).