Algebra 2 & Geometry 2

Practice Problems — Print Edition

ALGEBRA 2

A-01 · Quadratic Functions

Find the vertex of the parabola f(x) = 2x^2 - 8x + 5.

■ *Memory: h = -b/(2a), then plug in for k*

Answer: _____

A-02 · Complex Numbers

Simplify: (3 + 2i) / (1 - i) Write in a + bi form.

■ *Memory: Multiply top & bottom by the CONJUGATE of denominator*

Answer: _____

A-03 · Polynomial Division

Use synthetic division to find the remainder when

p(x) = x^3 - 4x^2 + x + 6 is divided by (x - 2).

■ *Memory: REMAINDER THEOREM — remainder = p(2), just plug in x = 2*

Answer: _____

A-04 · Exponential Equations

Solve for x: 4^(x+1) = 8^(x-1)

■ *Memory: Convert both sides to base 2, then set exponents equal*

Answer: _____

A-05 · Logarithms

Solve: log_2(x+3) + log_2(x-1) = 3 (Check domain!)

■ *Memory: log A + log B = log(AB) then check: x > 1*

Answer: _____

A-06 · Rational Functions

What is the horizontal asymptote of f(x) = (3x^2 - 5) / (x^2 + 2)?

■ *Memory: Same degree top & bottom → y = (lead coeff top)/(lead coeff bottom)*

Answer: _____

A-07 · Sequences & Series

The 3rd term of a geometric sequence is 12 and the 6th term is 96.

Find the common ratio r.

■ *Memory: a6/a3 = r^3 → r = cube root of (96/12)*

Answer: _____

A-08 · Systems of Equations

Solve: x^2 + y = 10 and x - y = 2

How many solutions does the system have?

■ *Memory: Substitution → solve quadratic → count valid real solutions*

Answer: _____

A-09 · Radical Equations

Solve: sqrt(2x + 1) = x - 1 (Check for extraneous roots!)

■ *Memory: Square both sides → solve quadratic → ALWAYS verify both roots*

Answer: _____

A-10 · Inverse Functions

If f(x) = (2x + 3) / (x - 1), find f^(-1)(5).

■ *Memory: f^-1(5) = x where f(x) = 5 → set f(x)=5 and solve*

Answer: _____

GEOMETRY 2

G-01 · Similar Triangles

Two similar triangles have sides 6, 8, 10 and 9, ?, 15.

Find the missing side.

■ *Memory: Find scale factor (ratio), multiply corresponding sides*

Answer: _____

G-02 · Circle Theorems

An inscribed angle intercepts an arc of 130°.

What is the measure of the inscribed angle?

■ *Memory: Inscribed angle = (1/2) * intercepted arc — ALWAYS half the arc*

Answer: _____

G-03 · Right Triangles & Trig

In right triangle ABC (right angle at C), sin A = 5/13.

Find cos A.

■ *Memory: sin^2 A + cos^2 A = 1 OR use 3-4-5 / 5-12-13 Pythagorean triples*

Answer: _____

G-04 · Volume & Surface Area

A cylinder has radius 3 and height 7.

Find its lateral surface area (in terms of pi).

■ *Memory: Lateral SA = 2*pi*r*h (unroll cylinder into rectangle)*

Answer: _____

G-05 · Coordinate Geometry

Find the radius of a circle with center (-2, 3) passing through (1, 7).

■ *Memory: radius = distance from center to point on circle (use distance formula)*

Answer: _____

G-06 · Parallel Lines & Angles

Parallel lines cut by transversal. Co-interior angles are (3x+10) and (2x+20) degrees.

Find x.

■ *Memory: Co-interior (same-side interior) angles are SUPPLEMENTARY = 180 degrees*

Answer: _____

G-07 · Triangle Centers

A median of a triangle has length 18.

How far is the centroid from the vertex?

■ *Memory: Centroid = 2/3 from vertex end of each median*

Answer: _____

G-08 · Transformations

Point P = (3, -2) is rotated 90 degrees counterclockwise about origin.

New coordinates?

■ *Memory: 90 deg CCW: (x, y) -> (-y, x) | 90 deg CW: (x, y) -> (y, -x)*

Answer: _____

G-09 · Law of Sines

In triangle ABC: a = 8, angle A = 30 deg, angle B = 45 deg.

Find side b.

■ *Memory: a/sin A = b/sin B (cross multiply, solve for b)*

Answer: _____

G-10 · Quadrilaterals

In parallelogram ABCD: angle A = (4x+10) deg, angle B = (2x+30) deg.

Find angle A.

■ *Memory: Consecutive angles in parallelogram are SUPPLEMENTARY (sum = 180 deg)*

Answer: _____

ANSWER KEY

A-01 (2, -3)	**G-01** 12
A-02 1/2 + 5/2 i	**G-02** 65 degrees
A-03 0	**G-03** 12/13
A-04 x = 5	**G-04** 42*pi
A-05 x = -1 + 2*sqrt(3)	**G-05** r = 5
A-06 y = 3	**G-06** x = 30
A-07 r = 2	**G-07** 12
A-08 2 solutions	**G-08** (2, 3)
A-09 x = 4	**G-09** 8*sqrt(2)
A-10 8/3	**G-10** 310/3 degrees (~103.3 deg)