Algebra 1 & Geometry

Core Practice Problems · Self-Study Edition · 20 Questions

PART 1 — ALGEBRA 1

✦ QUICK MEMORY POINTS

ISOLATE → get the variable alone · INVERSE → undo each operation in reverse order · DISTRIBUTE → multiply outside × everything inside · COMBINE → only like terms · FLIP THE SIGN → when dividing/multiplying both sides by a negative number in inequalities · FOIL → First · Outer · Inner · Last

A-01 **Linear Equations**

A school store sells notebooks for $3 each and pens for $1.50 each. Emma buys a total of 8 items and spends $18.00. How many notebooks did she buy?

(A) 3 notebooks	(B) 4 notebooks
(C) 5 notebooks	(D) 6 notebooks

A-02 **Inequalities ■ Tricky**

Solve the inequality: –3x + 7 > 16

■ *Watch out: What happens to the inequality sign when you divide by a negative number?*

(A) x > –3	(B) x > 3
(C) x < –3	(D) x < 3

★ *Key: FLIP the sign when multiplying or dividing by a negative!*

A-03 **Slope & Lines**

Two points are given: (2, 5) and (6, 13). What is the slope of the line through them?

$$m = (y■ – y■) / (x■ – x■)$$

(A) m = 1/2	(B) m = 2
(C) m = 4	(D) m = 8

A-04 **Distributive Property ■ Tricky**

Simplify completely:

$$3(2x - 4) - 2(5 - x)$$

(A) 8x – 2	(B) 4x – 22
(C) 8x – 22	(D) 8x + 22

★ *Key: –2 × (–x) = +2x (two negatives = positive)*

A-05 **Distance / Rate / Time**

A car travels at 60 mph. Another car starts 30 minutes later and travels at 80 mph in the same direction. How many hours after the second car departs will it catch up?

(A) 1 hour	(B) 1.25 hours
(C) 1.5 hours	(D) 2 hours

A-06 **Factoring ■ Tricky**

Factor completely:

$$x^2 - 5x - 14$$

Hint: find two numbers that multiply to –14 and add to –5.

(A) (x + 7)(x – 2)	(B) (x – 7)(x + 2)
(C) (x – 7)(x – 2)	(D) (x + 7)(x + 2)

★ *Key: SIGNS matter. Multiply to –14, add to –5 → use –7 and +2*

A-07 **Functions**

Given f(x) = 2x² – 3x + 1, evaluate f(–2).

(A) 3	(B) –1
(C) 7	(D) 15

★ *Key: (–2)² = +4, NOT –4 → squaring a negative always gives positive!*

A-08 Quadratic Formula ■ Tricky

Solve using the quadratic formula:

$$x^2 - 6x + 5 = 0$$

$$x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$$

(A) x = 3 ± 2	(B) x = 2 or x = 3
(C) x = 5 or x = 1	(D) x = –5 or x = –1

A-09 Percent & Proportion

A shirt originally costs $48. It is 25% off. Then 10% sales tax is added to the discounted price. What is the final price?

(A) $36.00	(B) $40.80
(C) $39.60	(D) $43.20

★ *Key: Apply percentages SEQUENTIALLY, not both to the original price!*

A-10 Systems of Equations ■ Tricky

Solve by substitution:

$$y = 2x - 1$$

$$3x + y = 9$$

What is the value of x?

(A) x = 1	(B) x = 2
(C) x = 3	(D) x = 4

PART 2 — GEOMETRY

✦ QUICK MEMORY POINTS

SUPPLEMENTARY → adds to 180° · COMPLEMENTARY → adds to 90° · PYTHAGOREAN → $a^2 + b^2 = c^2$ (c = hypotenuse, longest side) · SIMILAR → same shape, sides are proportional · EXTERIOR ANGLE → = sum of two non-adjacent interior angles · INTERIOR ANGLES → triangle = 180°, quadrilateral = 360°

G-01 **Angles ■ Tricky**

Two supplementary angles measure (3x + 10)° and (5x – 2)°.

What is the larger angle?

(A) 74.5°	(B) 90°
(C) 105.5°	(D) 120°

★ *Key: SUPPLEMENTARY = adds to 180° (not 90°)*

G-02 **Pythagorean Theorem**

A right triangle has legs of length 7 and 24.

What is the length of the hypotenuse?

$$a^2 + b^2 = c^2$$

(A) 20	(B) 23
(C) 25	(D) 31

★ *Memorize: 3-4-5, 5-12-13, 7-24-25 (Pythagorean triples!)*

G-03 **Area & Perimeter ■ Tricky**

A rectangle has a perimeter of 46 cm and a length of 14 cm.

What is the area?

$$P = 2(l + w) \quad A = l \times w$$

(A) 112 cm²	(B) 126 cm²
(C) 144 cm²	(D) 252 cm²

★ *Key: P = 2(l+w), so one side = P/2 – l → don't forget to divide by 2 first!*

G-04 **Similar Triangles ■ Tricky**

Two similar triangles have sides 4, 6, 8 (small) and a shortest side of 10 (large).

What is the longest side of the larger triangle?

(A) 14	(B) 16
(C) 18	(D) 20

★ *Key: SCALE FACTOR = 10/4 = 2.5 → multiply ALL sides by the same factor*

G-05 **Circle Area**

A circle has a diameter of 18 cm.

What is its area? (Use π ≈ 3.14)

$$A = \pi r^2$$

(A) 56.52 cm²	(B) 113.04 cm²
(C) 254.34 cm²	(D) 1017.36 cm²

★ ■ *diameter = 18, so RADIUS = 9 (most missed step!)*

G-06 **Exterior Angles**

In a triangle, two interior angles measure 52° and 79°.

What is the exterior angle at the third vertex?

(A) 49°	(B) 109°
(C) 131°	(D) 141°

★ *Shortcut: Exterior angle = sum of the two non-adjacent interior angles = 52 + 79*

G-07 **Volume ■ Tricky**

A cylinder (r = 5 cm, h = 12 cm) and a cone have the same base and height.

What is the difference in their volumes? (Use π ≈ 3.14)

$$V_{cyl} = \pi r^2 h \quad V_{cone} = (1/3)\pi r^2 h$$

(A) 314 cm³	(B) 471 cm³
(C) 628 cm³	(D) 942 cm³

★ *Key: A cone is always exactly 1/3 of the cylinder with the same base and height*

G-08 **Parallel Lines ■ Tricky**

Two parallel lines are cut by a transversal. One angle = 115°.

What is the co-interior (same-side interior) angle?

(A) 115° (equal)	(B) 65° (supplementary)
(C) 25° (complementary)	(D) 90° (perpendicular)

★ *ALTERNATE interior = EQUAL · CO-INTERIOR (same side) = SUPPLEMENTARY (180°)*

G-09 Distance Formula

What is the distance between points (1, 2) and (4, 6)?

$$d = \sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$$

(A) 3	(B) 4
(C) 5	(D) 7

★ *Recognize: $\Delta x = 3$, $\Delta y = 4 \rightarrow$ 3-4-5 right triangle!*

G-10 Surface Area ■ Tricky

A rectangular box has dimensions 3 cm × 4 cm × 5 cm.

What is its total surface area?

$$SA = 2(lw + lh + wh)$$

(A) 47 cm²	(B) 94 cm²
(C) 60 cm²	(D) 120 cm²

★ *Key: Don't forget the ×2 — every face has an opposite face!*

ANSWER KEY

Algebra 1

A-01: B	**A-02: C**	**A-03: B**	**A-04: C**	**A-05: C**
A-06: B	**A-07: D**	**A-08: C**	**A-09: C**	**A-10: B**

Geometry

G-01: C	**G-02: C**	**G-03: B**	**G-04: D**	**G-05: C**
G-06: C	**G-07: C**	**G-08: B**	**G-09: C**	**G-10: B**