

Math Practice

Algebra 1 & Geometry · 20 Problems · Study Guide

PART 1 — Algebra 1 (Questions 1–10)

Q1. [Algebra 1 · Linear Equations]

■ **Memory Point:** ISOLATE THE VARIABLE — Move numbers to one side, variable to the other

Ex: $2x + 4 = 10 \rightarrow 2x = 6 \rightarrow x = 3$

Sarah has \$45 and earns \$8/hr babysitting. She wants a \$93 jacket.

Which equation shows hours (h) she needs to work?

- A) $8h = 93$
- B) $45 + 8h = 93$
- C) $8h - 45 = 93$
- D) $45 - 8h = 93$

Q2. [Algebra 1 · Solving Equations]

■ **Memory Point:** INVERSE OPERATIONS — Undo addition with subtraction; undo multiplication with division

Ex: $3x - 7 = 14 \rightarrow \text{add } 7 \rightarrow 3x = 21 \rightarrow x = 7$

Solve for x: $4x - 9 = 2x + 5$. What is x?

- A) $x = 2$
- B) $x = 7$
- C) $x = -7$
- D) $x = 14$

Q3. [Algebra 1 · Inequalities]

■ **Memory Point:** FLIP WHEN NEGATIVE — Multiply or divide by a NEGATIVE \rightarrow reverse the inequality sign!

Ex: $-2x < 6 \rightarrow \text{divide by } -2 \text{ (flip!)} \rightarrow x > -3$

A movie theater charges \$12 per ticket. You have at most \$60.

Which inequality shows the max tickets (t) you can buy?

- A) $12t \geq 60$
- B) $12t \leq 60$
- C) $12t < 60$
- D) $12 + t \leq 60$

Q4. [Algebra 1 - Slope & Linear Functions]

■ **Memory Point:** RISE OVER RUN — Slope = $(y_2 - y_1) \div (x_2 - x_1)$. Change in $y \div$ change in x .

Ex: Points $(1,3)$ and $(4,9) \rightarrow$ slope = $(9-3)/(4-1) = 6/3 = 2$

A car travels at constant speed. After 2 hrs: 110 miles. After 5 hrs: 275 miles.

What is the speed (slope) in miles per hour?

- A) 45 mph
- B) 55 mph
- C) 60 mph
- D) 50 mph

Q5. [Algebra 1 - Slope-Intercept Form $y = mx + b$]

■ **Memory Point:** $y = mx + b$ — m = slope (steepness), b = y -intercept (starting point)

Ex: $y = 3x + 2 \rightarrow$ slope 3, crosses y -axis at $(0, 2)$

A cell phone plan charges \$20/month flat fee plus \$0.05 per text.

Which equation models monthly cost C for t texts?

- A) $C = 0.05 + 20t$
- B) $C = 20t + 0.05$
- C) $C = 0.05t + 20$
- D) $C = 20 - 0.05t$

Q6. [Algebra 1 - Systems of Equations]

■ **Memory Point:** SUBSTITUTION or ELIMINATION — Plug one equation into the other, or add/subtract to cancel a variable.

Ex: $y = 2x$ and $x + y = 9 \rightarrow x + 2x = 9 \rightarrow x = 3$

Two friends together have 24 marbles.

One has 4 more than the other. How many does each have?

- A) 10 and 14
- B) 11 and 13
- C) 12 and 12
- D) 8 and 16

Q7. [Algebra 1 - Exponents]

■ **Memory Point:** SAME BASE \rightarrow ADD EXPONENTS — $a^m \times a^n = a^{(m+n)}$. Power rule: $(a^m)^n = a^{(m \times n)}$.

Ex: $x^3 \cdot x^4 = x^7$ | $(x^2)^3 = x^6$

Simplify: $x^2 \cdot x^5$. Which answer is correct?

- A) x^{10}
- B) x^7
- C) $2x^7$
- D) x^3

Q8. [Algebra 1 - Factoring Trinomials]

■ **Memory Point:** FIND TWO NUMBERS — For $x^2 + bx + c$, find two numbers that MULTIPLY to c and ADD to b .

Ex: $x^2 + 5x + 6$: numbers $x=6$ and $+5 \rightarrow 2$ and $3 \rightarrow (x+2)(x+3)$

Which is the correct factored form of $x^2 + 7x + 12$?

- A) $(x + 3)(x + 4)$
- B) $(x + 2)(x + 6)$
- C) $(x + 1)(x + 12)$
- D) $(x - 3)(x - 4)$

Q9. [Algebra 1 - Functions]

■ **Memory Point:** VERTICAL LINE TEST — A function gives EXACTLY ONE output for every input.

Ex: $f(x) = 2x + 1 \rightarrow f(3) = 2(3) + 1 = 7$

If $f(x) = x^2 - 3x + 2$, what is $f(4)$?

- A) 6
- B) 4
- C) 8
- D) 10

Q10. [Algebra 1 - Percentages]

■ **Memory Point:** PERCENT = PART \div WHOLE \times 100 — "Of" means multiply. Convert % to decimal first.

Ex: 30% of 80 = $0.30 \times 80 = 24$

A shirt originally costs \$60. It is on sale for 25% off.

What is the sale price?

- A) \$15
- B) \$35
- C) \$45
- D) \$50

PART 2 — Geometry (Questions 11–20)

Q11. [Geometry - Area of Triangles]

■ **Memory Point:** HALF BASE TIMES HEIGHT — $A = (1/2) \times b \times h$. Height must be PERPENDICULAR to the base.

Ex: base 10, height 6 $\rightarrow A = (1/2) \times 10 \times 6 = 30$

A triangular garden has a base of 14 m and a height of 9 m.

What is its area?

- A) 126 m²
- B) 63 m²
- C) 46 m²
- D) 94.5 m²

Q12. [Geometry - Pythagorean Theorem]

■ **Memory Point:** $a^2 + b^2 = c^2$ — c is always the HYPOTENUSE (longest side, opposite the right angle).

Ex: Legs 3 and 4 $\rightarrow c^2 = 9+16 = 25 \rightarrow c = 5$

A ladder 13 feet long leans against a wall.

Its base is 5 feet from the wall. How high does it reach?

- A) 8 ft
- B) 10 ft
- C) 12 ft
- D) 11 ft

Q13. [Geometry - Circles — Circumference & Area]

■ **Memory Point:** $C = 2\pi r$, $A = \pi r^2$ — Diameter = $2r$. Never use diameter in the area formula!

Ex: $r = 5 \rightarrow A = \pi(25) \approx 78.5$

A circular pond has a diameter of 20 m.

What is its area? (Use $\pi \approx 3.14$)

- A) 314 m²
- B) 62.8 m²
- C) 1,256 m²
- D) 157 m²

Q14. [Geometry - Angles — Parallel Lines]

■ **Memory Point:** ALTERNATE INTERIOR = EQUAL | CO-INTERIOR (same side) = 180°

Ex: Z-angles (alternate interior) are equal. Co-interior angles are supplementary.

Two parallel lines are cut by a transversal.

One co-interior angle is 65°. What is the other co-interior angle?

- A) 65°
- B) 115°
- C) 125°
- D) 25°

Q15. [Geometry - Volume of Rectangular Prism]

■ **Memory Point:** $V = l \times w \times h$ — Think: how many unit cubes fit inside?

Ex: box $4 \times 3 \times 2 \rightarrow V = 24$ cubic units

A fish tank is 60 cm long, 30 cm wide, and 40 cm tall.

What is its volume?

- A) 72,000 cm³
- B) 7,200 cm³
- C) 720 cm³
- D) 5,400 cm³

Q16. [Geometry - Triangle Angle Sum]

■ **Memory Point:** ALL TRIANGLES = 180° — The three interior angles ALWAYS add to exactly 180° .

Ex: 40° and $75^\circ \rightarrow$ third angle = $180^\circ - 40^\circ - 75^\circ = 65^\circ$

A triangle has angles of 48° and 73° .

What is the third angle?

- A) 49°
- B) 59°
- C) 69°
- D) 79°

Q17. [Geometry - Perimeter]

■ **Memory Point:** PERIMETER = WALK AROUND — Add ALL sides. Rectangle: $P = 2l + 2w$.

Ex: Rectangle $8 \times 5 \rightarrow P = 2(8) + 2(5) = 26$

A rectangular yard is 35 ft long and 22 ft wide.

Fencing costs \$4 per foot. Total fencing cost?

- A) \$228
- B) \$456
- C) \$3,080
- D) \$1,540

Q18. [Geometry - Coordinate Geometry — Midpoint]

■ **Memory Point:** MIDPOINT = AVERAGE — $((x_1+x_2)/2, (y_1+y_2)/2)$. Just average the x's and y's.

Ex: $(2,4)$ and $(8,10) \rightarrow$ midpoint = $(5, 7)$

Point A is at $(3, 7)$ and Point B is at $(9, 1)$.

What is the midpoint of AB?

- A) $(6, 3)$
- B) $(6, 4)$
- C) $(5, 4)$
- D) $(12, 8)$

Q19. [Geometry - Similarity & Scale]

■ **Memory Point:** SCALE FACTOR — Similar figures have equal ratios. Set up a proportion!

Ex: Scale $1:3$, small side = $5 \rightarrow$ large side = 15

A map uses a scale of 1 inch = 25 miles.

Two cities are 3.6 inches apart on the map. Real distance?

- A) 6.94 miles
- B) 90 miles
- C) 75 miles
- D) 100 miles

Q20. Geometry - Surface Area

■ **Memory Point:** UNFOLD INTO FACES — SA = sum of ALL faces. Box formula: $SA = 2(lw + lh + wh)$.

Ex: cube side 4 $\rightarrow SA = 6 \times 16 = 96$

A rectangular box is 8 cm long, 5 cm wide, and 3 cm tall.

What is its total surface area?

- A) 158 cm²
- B) 120 cm²
- C) 79 cm²
- D) 180 cm²

ANSWER KEY

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	B	3	B	4	B	5	C
6	A	7	B	8	A	9	A	10	C
11	B	12	C	13	A	14	B	15	A
16	B	17	B	18	B	19	B	20	A

Tip: Cover the answer key while solving. After finishing, check your work and review any mistakes.