

# Algebra 1 & Geometry

20 Multiple-Choice Problems · Linear Functions · Equations · Inequalities · Triangles · Polygons · Circles

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## SECTION 1 — Algebra 1: Linear Functions · Equations · Inequalities

Q1 · Linear Function

Which equation represents a linear function?

■ *KEY: Linear = no exponent on x, no x in denominator →  $y = mx + b$*

(A)  $y = x^2 + 3$

(B)  $y = 2x - 5$

(C)  $y = 1/x + 4$

(D)  $y = \sqrt{x} + 1$

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Q2 · Slope

Find the slope of the line passing through (2, 5) and (6, 13).

*Formula: slope  $m = (y_2 - y_1) / (x_2 - x_1)$*

■ *RISE over RUN — subtract in the same order top and bottom*

(A) 1

(B) 3

(C) 2

(D) 4

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Q3 · Equation

Solve:  $3x + 7 = 22$

■ *ISOLATE x: subtract constant first, then divide (reverse PEMDAS)*

(A)  $x = 5$

(B)  $x = 9$

(C)  $x = 3$

(D)  $x = 29$

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Q4 · Inequality

Solve the inequality:  $-2x + 4 > 10$

■ *FLIP the inequality sign when multiplying or dividing by a negative!*

(A)  $x > -3$

(B)  $x > 3$

(C)  $x < 3$

(D)  $x < -3$

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Q5 · y-intercept

What is the y-intercept of the line:  $4x - 2y = 8$

■ *y-intercept: substitute  $x = 0$  and solve for y*

(A) (0, 4)

(B) (0, -4)

(C) (2, 0)

(D) (0, 8)

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Q6 · Equation

**Find x:  $5(x - 2) = 3x + 4$**

■ *DISTRIBUTE first, then collect like terms, then isolate x*

(A)  $x = 5$

(B)  $x = 3$

(C)  $x = 7$

(D)  $x = 1$

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Q7 · Slope-Intercept Form

**A line has slope  $-3$  and passes through (0, 6). What is its equation?**

*Formula:  $y = mx + b$  ( $m = \text{slope}$ ,  $b = \text{y-intercept}$ )*

■ *The y-intercept is the b value; plug in m and b directly*

(A)  $y = -3x + 6$

(B)  $y = 3x + 6$

(C)  $y = -3x - 6$

(D)  $y = -6x + 3$

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Q8 · Compound Inequality

**Solve:  $-1 \leq 2x + 3 < 7$**

■ *Apply the same operation to ALL three parts simultaneously*

(A)  $-2 \leq x < 2$  (closed at  $-2$ , open at  $2$ )

(B)  $-4 \leq x < 2$

(C)  $-4 \leq x < 4$

(D)  $1 \leq x < 5$

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Q9 · Systems of Equations

**Find x:  $y = 2x + 1$  and  $y = -x + 7$**

■ *SUBSTITUTION: both equal y → set them equal to each other*

(A)  $x = 3$

(B)  $x = 1$

(C)  $x = 6$

(D)  $x = 2$

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Q10 · Rate of Change

**A phone plan charges \$20/month plus \$0.05 per text (t). Which equation gives cost C?**

■ *Fixed cost = b (y-intercept), rate per unit = m (slope)*

(A)  $C = 20t + 0.05$

(B)  $C = 0.05 + 20t$

(C)  $C = 0.05t + 20$

(D)  $C = 20 - 0.05t$

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## SECTION 2 — Geometry: Triangles · Polygons · Circles

Q11 · Triangle — Pythagorean

**A right triangle has legs 6 and 8. What is the length of its hypotenuse?**

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

■ *c is always the hypotenuse (longest side); memorize 3-4-5 and 5-12-13 triples*

- (A) 12 (B) 10  
(C) 14 (D)  $\sqrt{48}$
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Q12 · Triangle — Angle Sum

**Two angles of a triangle are  $47^\circ$  and  $85^\circ$ . Find the third angle.**

■ *TRIANGLE SUM: all interior angles add to exactly  $180^\circ$*

- (A)  $48^\circ$  (B)  $58^\circ$   
(C)  $132^\circ$  (D)  $42^\circ$
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Q13 · Polygon — Interior Angle Sum

**What is the sum of interior angles of a hexagon?**

Formula:  $Sum = (n - 2) \times 180^\circ$

■ *Count sides (n), subtract 2, multiply by 180*

- (A)  $540^\circ$  (B)  $900^\circ$   
(C)  $720^\circ$  (D)  $1080^\circ$
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Q14 · Circle — Area

**A circle has radius 5. What is its area? (Use  $\pi \approx 3.14$ )**

Formula:  $Area = \pi r^2$

■ *AREA uses  $r^2$  · CIRCUMFERENCE uses  $2r$  — don't mix them!*

- (A) 31.4 (B) 15.7  
(C)  $25\pi \approx 78.5$  (D) 78.5
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Q15 · Similar Triangles

**Two similar triangles have sides in ratio 3:5. If the smaller has a side of 9, find the corresponding side of the larger.**

■ *SIMILAR: corresponding sides are proportional → set up a proportion*

- (A) 12 (B) 15  
(C) 27 (D) 45
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Q16 · Circle — Circumference

**A circle has circumference  $24\pi$ . What is its diameter?**

Formula:  $C = \pi d$

■ Diameter =  $2 \times$  radius;  $C = \pi \times$  diameter (just divide  $C$  by  $\pi$ )

- (A) 24 (B) 12  
(C) 48 (D) 6
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Q17 · Triangle — Area

**A triangle has base 10 and height 7. What is its area?**

Formula: Area =  $(1/2) \times$  base  $\times$  height

■ Triangle is HALF a rectangle — never forget the 1/2 !

- (A) 70 (B) 17  
(C) 35 (D) 24
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Q18 · Exterior Angle Theorem

**An exterior angle of a triangle is  $110^\circ$ . One non-adjacent interior angle is  $65^\circ$ . Find the other non-adjacent interior angle.**

■ EXTERIOR ANGLE = sum of the two NON-ADJACENT interior angles

- (A)  $70^\circ$  (B)  $175^\circ$   
(C)  $25^\circ$  (D)  $45^\circ$
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Q19 · Regular Polygon

**Each interior angle of a regular polygon is  $135^\circ$ . How many sides does it have?**

Formula: Interior angle =  $(n - 2) \times 180^\circ / n$

■ Shortcut: exterior angle =  $180^\circ -$  interior angle; sides =  $360^\circ \div$  exterior angle

- (A) 8 (B) 6  
(C) 10 (D) 5
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Q20 · Circle — Arc Length

**A circle has radius 9. A central angle of  $60^\circ$  subtends an arc. Find the arc length (in terms of  $\pi$ ).**

Formula: Arc length =  $(\theta/360^\circ) \times 2\pi r$

■ Arc = FRACTION of circumference:  $\theta/360 \times$  full circumference

- (A)  $9\pi$  (B)  $3\pi$   
(C)  $6\pi$  (D)  $18\pi$
- 

**ANSWER KEY**

Q1: <b>B</b>	Q2: <b>C</b>	Q3: <b>A</b>	Q4: <b>D</b>	Q5: <b>B</b>
Q6: <b>C</b>	Q7: <b>A</b>	Q8: <b>A</b>	Q9: <b>D</b>	Q10: <b>C</b>
Q11: <b>B</b>	Q12: <b>A</b>	Q13: <b>C</b>	Q14: <b>D</b>	Q15: <b>B</b>
Q16: <b>A</b>	Q17: <b>C</b>	Q18: <b>D</b>	Q19: <b>A</b>	Q20: <b>B</b>

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