

# Pre-Algebra & Geometry

Self-Study Worksheet · 20 Questions · Multiple Choice

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 20

## PART 1 — Pre-Algebra (Questions 1–10)

### MEMORY POINTS — PRE-ALGEBRA

ORDER OF OPERATIONS: PEMDAS (Parentheses → Exponents → Multiply/Divide → Add/Subtract) VARIABLE: a letter that holds an unknown number (solve for it!) INVERSE OPERATION: undo x with /, undo + with - PROPORTION: cross-multiply:  $a/b = c/d \rightarrow axd = bxc$  PERCENT: Part = Percent  $\times$  Whole / 100 NEGATIVE RULE:  $(-) \times (-) = (+)$  |  $(-) \times (+) = (-)$

#### Q 01 Pre-Algebra | PEMDAS

Evaluate:  $3 + 4 \times 2 - (6 / 3)$

Trap: Do NOT add 3+4 first. Multiplication comes before addition (PEMDAS).

PEMDAS -> Parentheses first, then x/, then +-

A) 12	B) 9
C) 7	D) 14

#### Q 02 Pre-Algebra | Equations

Solve for x:  $2x + 5 = 17$

Trap: Subtract 5 first, THEN divide. Do not divide 17 by 2 first!

Isolate x -> subtract 5 from both sides -> divide by 2

A) 5	B) 6
C) 7	D) 11

#### Q 03 Pre-Algebra | Negative Numbers

What is  $-3 \times (-4) + (-2)$  ?

Trap:  $(-) \times (-)$  is POSITIVE. Then add -2.

$(-) \times (-) = (+)$  |  $(+) + (-) = \text{subtract}$

A) -14	B) 14
C) 10	D) -10

#### Q 04 Pre-Algebra | Proportions

A recipe needs 3 cups of flour for 12 cookies. How many cups for 20 cookies?

Trap: Set up the proportion carefully. Same units on each side.

$3/12 = x/20 \rightarrow$  Cross-multiply:  $12x = 60 \rightarrow x = 5$

A) 4 cups	B) 5 cups
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C) 6 cups	D) 4.5 cups
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**Q 05 Pre-Algebra | Percent**

A jacket costs \$80. It is 25% off. What is the sale price?

Trap: 25% off means you pay 75%. Subtract the discount!

$$\text{Discount} = 80 \times 0.25 = 20 \quad | \quad \text{Sale Price} = 80 - 20$$

A) \$20	B) \$55
C) \$60	D) \$65

**Q 06 Pre-Algebra | Inequalities**

Which value of x makes this TRUE?  $3x - 2 > 10$

Trap: Solve like an equation:  $3x > 12$ , so  $x > 4$ .

$$3x - 2 > 10 \rightarrow 3x > 12 \rightarrow x > 4$$

A) $x = 3$	B) $x = 4$
C) $x = 5$	D) $x = 2$

**Q 07 Pre-Algebra | Exponents**

Simplify:  $2^3 \times 2^2$

Trap: Same base -> ADD the exponents. Do NOT multiply them!

$$a^m \times a^n = a^{(m+n)} \rightarrow 2^{(3+2)} = 2^5 = 32$$

A) $2^6 = 64$	B) $2^5 = 32$
C) $4^5 = 1024$	D) $2^6 = 32$

**Q 08 Pre-Algebra | Like Terms**

Simplify:  $5x + 3 - 2x + 7$

Trap: Only combine terms with the same variable.  $5x$  and  $3$  are NOT like terms!

$$x\text{-terms: } 5x - 2x = 3x \quad | \quad \text{Constants: } 3 + 7 = 10$$

A) $13x$	B) $3x + 10$
C) $7x + 10$	D) $3x + 4$

**Q 09 Pre-Algebra | Fractions in Equations**

Solve for x:  $\frac{x}{3} + 2 = 5$

Trap: Subtract 2 first, then multiply by 3.

$$\frac{x}{3} = 3 \rightarrow x = 9 \quad | \quad \text{Check: } \frac{9}{3} + 2 = 5 \quad \checkmark$$

A) $x = 3$	B) $x = 6$
C) $x = 9$	D) $x = 21$

**Q 10 Pre-Algebra | Rate - Word Problem**

Maria walks 3 miles per hour. The store is 7.5 miles away. How long will it take?

Trap:  $\text{Time} = \text{Distance} / \text{Rate}$ . Don't multiply distance  $\times$  rate!

$$\text{Time} = \text{Distance} / \text{Rate} = 7.5 / 3 = 2.5 \text{ hours}$$

A) 2 hours	B) 2.5 hours
C) 3 hours	D) 4.5 hours

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## PART 2 — Geometry (Questions 11–20)

### MEMORY POINTS — GEOMETRY

TRIANGLE ANGLES: always sum to  $180^\circ$  AREA of RECTANGLE:  $A = \text{length} \times \text{width}$  AREA of TRIANGLE:  $A = (1/2) \times \text{base} \times \text{height}$  CIRCLE: Area =  $\pi r^2$  | Circumference =  $2\pi r$  ( $r = \text{radius}$ , NOT diameter) PYTHAGOREAN THEOREM:  $a^2 + b^2 = c^2$  (right triangles only) SUPPLEMENTARY = two angles sum to  $180^\circ$  | COMPLEMENTARY = sum to  $90^\circ$  VOLUME of BOX:  $V = \text{length} \times \text{width} \times \text{height}$

#### Q 11 Geometry | Triangle Angles

A triangle has angles of  $45^\circ$  and  $70^\circ$ . What is the third angle?

Trap: All 3 angles must sum to  $180^\circ$ , not  $90^\circ$  or  $360^\circ$ !

$$\text{Angle sum} = 180^\circ \rightarrow \text{Third angle} = 180 - 45 - 70$$

A) $55^\circ$	B) $70^\circ$
C) $65^\circ$	D) $115^\circ$

#### Q 12 Geometry | Area of Triangle

A triangle has a base of 10 cm and a height of 6 cm. What is its area?

Trap: Don't forget the  $1/2$ ! Area =  $(1/2) \times \text{base} \times \text{height}$ .

$$A = (1/2) \times 10 \times 6 = 30 \text{ cm}^2$$

A) $60 \text{ cm}^2$	B) $30 \text{ cm}^2$
C) $16 \text{ cm}^2$	D) $50 \text{ cm}^2$

#### Q 13 Geometry | Circle Circumference

A circle has a diameter of 14 inches. What is the circumference? ( $\pi = 3.14$ )

Trap: Formula uses RADIUS. Radius = Diameter / 2 = 7.

$$C = 2 \times \pi \times r = 2 \times 3.14 \times 7 = 43.96 \text{ in}$$

A) 21.98 in	B) 153.86 in
C) 43.96 in	D) 87.92 in

#### Q 14 Geometry | Pythagorean Theorem

A right triangle has legs of 3 ft and 4 ft. What is the hypotenuse?

Trap: Hypotenuse is NOT  $3 + 4 = 7$ . Use squares:  $a^2 + b^2 = c^2$ .

$$3^2 + 4^2 = 9 + 16 = 25 \rightarrow c = \sqrt{25} = 5$$

A) 7 ft	B) 5 ft
C) 6 ft	D) $\sqrt{7}$ ft

#### Q 15 Geometry | Supplementary Angles

Two supplementary angles. One is  $112^\circ$ . What is the other?

Trap: Supplementary =  $180^\circ$ . Complementary =  $90^\circ$ . Don't confuse them!

Supplementary:  $A + B = 180^\circ \rightarrow B = 180 - 112 = 68^\circ$

A) $22^\circ$	B) $78^\circ$
C) $68^\circ$	D) $248^\circ$

**Q 16 Geometry | Area of Circle**

A circle has a radius of 5 m. What is its area? ( $\pi = 3.14$ )

Trap: Area =  $\pi \times r^2$  (radius SQUARED). Not  $\pi \times r$ !

$$A = \pi \times r^2 = 3.14 \times 25 = 78.5 \text{ m}^2$$

A) $31.4 \text{ m}^2$	B) $78.5 \text{ m}^2$
C) $15.7 \text{ m}^2$	D) $314 \text{ m}^2$

**Q 17 Geometry | Perimeter**

A rectangle has length 9 cm and width 4 cm. What is the perimeter?

Trap: Two lengths and two widths!  $P = 2(l + w)$ , not just  $l + w$ .

$$P = 2 \times (9 + 4) = 2 \times 13 = 26 \text{ cm}$$

A) 13 cm	B) 36 cm
C) 26 cm	D) 22 cm

**Q 18 Geometry | Volume**

A box is 5 cm long, 3 cm wide, 4 cm tall. What is its volume?

Trap: Volume uses all THREE dimensions. Area only uses two!

$$V = l \times w \times h = 5 \times 3 \times 4 = 60 \text{ cm}^3$$

A) $24 \text{ cm}^3$	B) $47 \text{ cm}^3$
C) $60 \text{ cm}^3$	D) $120 \text{ cm}^3$

**Q 19 Geometry | Missing Leg — Pythagorean**

Right triangle: hypotenuse = 13 m, one leg = 5 m. Find the other leg.

Trap:  $c$  is the hypotenuse (longest). Missing leg:  $a^2 = c^2 - b^2$ .

$$a^2 = 13^2 - 5^2 = 169 - 25 = 144 \rightarrow a = 12 \text{ m}$$

A) 8 m	B) 12 m
C) $\sqrt{194}$ m	D) 10 m

**Q 20 Geometry | Composite Area**

Rectangle (6 m x 4 m) + Triangle on top (base 6 m, height 3 m). Total area?

Trap: Add the AREAS separately, then total. Use correct formula for each.

$$\text{Rectangle: } 6 \times 4 = 24 \quad | \quad \text{Triangle: } (1/2) \times 6 \times 3 = 9 \quad | \quad \text{Total} = 33 \text{ m}^2$$

A) $42 \text{ m}^2$	B) $33 \text{ m}^2$
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C) 24 m<sup>2</sup>

D) 36 m<sup>2</sup>

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# ANSWER KEY

<b>Q01</b>	<b>Q02</b>	<b>Q03</b>	<b>Q04</b>	<b>Q05</b>
(B)	(B)	(C)	(B)	(C)
<b>Q06</b>	<b>Q07</b>	<b>Q08</b>	<b>Q09</b>	<b>Q10</b>
(C)	(B)	(B)	(C)	(B)
<b>Q11</b>	<b>Q12</b>	<b>Q13</b>	<b>Q14</b>	<b>Q15</b>
(C)	(B)	(C)	(B)	(C)
<b>Q16</b>	<b>Q17</b>	<b>Q18</b>	<b>Q19</b>	<b>Q20</b>
(B)	(C)	(C)	(B)	(B)

## FORMULA QUICK REFERENCE

<b>PEMDAS</b>	Parentheses → Exponents → Multiply/Divide → Add/Subtract
<b>Equation</b>	Inverse operations: undo + with -, undo x with /
<b>Proportion</b>	$a/b = c/d \rightarrow$ cross-multiply: $axd = bxc$
<b>Percent</b>	Part = Percent × Whole / 100   Discount = Price × rate
<b>Exponent Product</b>	$a^m \times a^n = a^{(m+n)}$ (same base: ADD exponents)
<b>Triangle angles</b>	Angle1 + Angle2 + Angle3 = $180^\circ$
<b>Area: Triangle</b>	$A = (1/2) \times \text{base} \times \text{height}$
<b>Area: Rectangle</b>	$A = \text{length} \times \text{width}$
<b>Perimeter: Rectangle</b>	$P = 2 \times (\text{length} + \text{width})$
<b>Area: Circle</b>	$A = \pi \times r^2$ (use r = radius, NOT diameter)
<b>Circumference</b>	$C = 2 \times \pi \times r \rightarrow$ if given diameter: $r = \text{diameter} / 2$
<b>Pythagorean Thm</b>	$a^2 + b^2 = c^2$   missing leg: $a^2 = c^2 - b^2$
<b>Volume: Box</b>	$V = \text{length} \times \text{width} \times \text{height}$
<b>Supplementary</b>	Two angles: sum = $180^\circ$   Complementary: sum = $90^\circ$