

MATH MASTERY WORKSHEET

Pre-Algebra · Geometry · Print Edition · Answer Key Included

PART 1 — PRE-ALGEBRA

Q1. Pre-Algebra | ■ Tricky

MEMORY KEY ■ NEGATIVE × NEGATIVE = POSITIVE | 'double negative = positive'

Sarah has a bank account. She owes her friend \$15, written as $-\$15$. If she 'undoes' (negates) that debt 3 times, what is the result?

Calculate: $(-15) \times (-3)$

QUICK EXAMPLE: $(-4) \times (-5) = +20$ ← two negatives cancel out

A) -45

B) -18

C) ★ $+45$

D) $+18$

Q2. Pre-Algebra | ■ Tricky

MEMORY KEY ■ PEMDAS: Parentheses · Exponents · $\times \div$ · $+-$

What is $3 + 4 \times 2 - 1$?

QUICK EXAMPLE: $2 + 3 \times 4 \rightarrow$ do \times first: $2 + 12 = 14$ (NOT 20!)

A) 13

B) ★ 10

C) 14

D) 6

Q3. Pre-Algebra

MEMORY KEY ■ FRACTION DIVISION: Keep · Change · Flip (KCF)

A recipe needs $\frac{3}{4}$ cup of sugar per batch. You have 3 cups of sugar. How many complete batches can you make?

Calculate: $3 \div \frac{3}{4}$

QUICK EXAMPLE: $2 \div \frac{1}{3} \rightarrow$ Keep 2, Change \div to \times , Flip $\rightarrow 2 \times 3 = 6$

A) 2

B) $2\frac{1}{4}$

C) ★ 4

D) $\frac{9}{4}$

Q4. Pre-Algebra | ■ Tricky

MEMORY KEY ■ INEQUALITY FLIP: divide by **NEGATIVE** → flip the sign

Solve the inequality: $-2x + 5 > 11$

Which value of x makes this true?

QUICK EXAMPLE: $-3x > 9$ → divide by -3 AND flip: $x < -3$

A) ★ $x < -3$	B) $x > -3$
C) $x < 3$	D) $x > 3$

Q5. Pre-Algebra

MEMORY KEY ■ PERCENT: Part ÷ Whole × 100 | 'IS over OF'

A jacket originally costs \$80. It is on sale for 30% off. What is the sale price?

QUICK EXAMPLE: 20% off \$50: discount = $0.20 \times 50 = \$10$, sale price = $\$50 - \$10 = \$40$

A) \$30	B) \$50
C) ★ \$56	D) \$24

Q6. Pre-Algebra | ■ Tricky

MEMORY KEY ■ LIKE TERMS: same variable + same exponent → can combine

Simplify: $3x^2 + 5x - 2x^2 + x - 4$

QUICK EXAMPLE: $4y^2 + 2y - y^2 + 3y = (4-1)y^2 + (2+3)y = 3y^2 + 5y$

A) $5x^2 + 4x - 4$	B) ★ $x^2 + 6x - 4$
C) $x^2 + 5x - 4$	D) $5x^2 + 6x - 4$

Q7. Pre-Algebra

MEMORY KEY ■ PROPORTION: $a/b = c/d$ → cross-multiply: $ad = bc$

A car travels 150 miles in 3 hours. At the same speed, how many miles does it travel in 5 hours?

QUICK EXAMPLE: $60 \text{ mi}/2 \text{ hr} = x/5 \text{ hr} \rightarrow 60 \times 5 = 2x \rightarrow x = 150 \text{ miles}$

A) 200 miles	B) 225 miles
C) ★ 250 miles	D) 300 miles

Q8. Pre-Algebra | ■ Tricky

MEMORY KEY ■ EXPONENTS: $x^a \times x^b = x^{(a+b)}$ | 'Same base → ADD powers'

Simplify: $x^3 \times x^{\blacksquare} \div x^2$

QUICK EXAMPLE: $y^2 \times y^3 = y^{\blacksquare}$ (add) | $y^{\blacksquare} \div y^2 = y^{\blacksquare}$ (subtract)

A) x^{\blacksquare}

B) $x^{2\blacksquare}$

C) ★ x^{\blacksquare}

D) x^{\blacksquare}

Q9. Pre-Algebra

MEMORY KEY ■ SLOPE: $m = (y^{\blacksquare} - y^{\blacksquare}) / (x^{\blacksquare} - x^{\blacksquare})$ | 'rise over run, never run/rise'

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

QUICK EXAMPLE: Points (1,2) and (3,8): slope = $(8-2)/(3-1) = 6/2 = 3$

A) 1

B) ★ 2

C) 3

D) 4

Q10. Pre-Algebra | ■ Tricky

MEMORY KEY ■ DISTRIBUTIVE: $a(b+c) = ab + ac$ | 'Multiply EVERYONE inside'

Solve for x: $2(3x - 4) = 5x + 6$

QUICK EXAMPLE: $2(x+3)=10 \rightarrow$ distribute: $2x+6=10 \rightarrow 2x=4 \rightarrow x=2$

A) $x = 2$

B) $x = 10$

C) $x = 1$

D) ★ $x = 14$

PART 2 — GEOMETRY

Q11. Geometry | ■ Tricky

MEMORY KEY ■ PYTHAGOREAN: $a^2 + b^2 = c^2$ | c = hypotenuse (opposite 90°)

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

QUICK EXAMPLE: Legs 3,4: $3^2+4^2=9+16=25 \rightarrow c=\sqrt{25}=5$ | Memorize: 3-4-5 triple!

A) 7	B) 12
C) ★ 10	D) 14

Q12. Geometry

MEMORY KEY ■ SUPPLEMENTARY= 180° | COMPLEMENTARY= 90° | 'S before C, $180 > 90$ '

Two angles are supplementary. One angle measures 117° . What is the other angle?

QUICK EXAMPLE: Supplementary: $65^\circ + ? = 180^\circ \rightarrow ? = 115^\circ$

A) 73°	B) ★ 63°
C) 53°	D) 27°

Q13. Geometry | ■ Tricky

MEMORY KEY ■ CIRCLE AREA: $A = \pi r^2$ | CIRCUMFERENCE: $C = 2\pi r$ | 'Area needs r^2 '

A circular pizza has a diameter of 14 inches. What is its area? (Use $\pi \approx 3.14$)

QUICK EXAMPLE: Diameter=10 \rightarrow radius=5 \rightarrow Area = $\pi \times 5^2 = 3.14 \times 25 = 78.5 \text{ in}^2$

A) 43.96 in^2	B) 87.92 in^2
C) ★ 153.86 in^2	D) 615.44 in^2

Q14. Geometry

MEMORY KEY ■ TRIANGLE ANGLES: always sum to 180° | 'Three corners, 180 total'

A triangle has angles of 48° and 75° . What is the measure of the third angle?

QUICK EXAMPLE: Angles 40° and 90° : third = $180^\circ - 40^\circ - 90^\circ = 50^\circ$

A) 47°	B) 53°
C) ★ 57°	D) 63°

Q15. Geometry | ■ Tricky

MEMORY KEY ■ CYLINDER VOLUME: $V = \pi r^2 h$ | 'Circle base \times height'

A cylindrical water tank has radius 4 ft and height 10 ft. What is its volume? ($\pi \approx 3.14$)

QUICK EXAMPLE: $r=3, h=5: V = 3.14 \times 3^2 \times 5 = 3.14 \times 9 \times 5 = 141.3 \text{ ft}^3$

A) 125.6 ft^3

B) 251.2 ft^3

C) ★ 502.4 ft^3

D) 2009.6 ft^3

Q16. Geometry

MEMORY KEY ■ SIMILAR TRIANGLES: corresponding sides PROPORTIONAL | 'Same shape, different size'

Two similar triangles have sides in ratio 3:5. The smaller triangle has perimeter 24 cm. What is the perimeter of the larger?

QUICK EXAMPLE: Ratio 2:3, small perimeter=10 $\rightarrow 10/2 \times 3 = 15$

A) 30 cm

B) 36 cm

C) ★ 40 cm

D) 48 cm

Q17. Geometry | ■ Tricky

MEMORY KEY ■ ALTERNATE INTERIOR ANGLES: EQUAL when lines are parallel | 'Z-angles'

Two parallel lines are cut by a transversal. One alternate interior angle is 68° . What is the other?

QUICK EXAMPLE: The two angles forming a 'Z' between parallel lines are always EQUAL.

A) ★ 68°

B) 112°

C) 22°

D) 90°

Q18. Geometry

MEMORY KEY ■ TRAPEZOID AREA: $A = \frac{1}{2}(b_1 + b_2) \times h$ | 'Average bases, then \times height'

A trapezoid has bases of 8 cm and 14 cm, and height of 6 cm. What is its area?

QUICK EXAMPLE: Bases 4,6, height 5: $A = \frac{1}{2}(4+6) \times 5 = \frac{1}{2} \times 10 \times 5 = 25 \text{ cm}^2$

A) 84 cm^2

B) 132 cm^2

C) ★ 66 cm^2

D) 48 cm^2

Q19. Geometry | ■ Tricky

MEMORY KEY ■ EXTERIOR ANGLE THEOREM: exterior = sum of TWO non-adjacent interior angles

In a triangle, two interior angles are 42° and 58° . What is the exterior angle at the third vertex?

QUICK EXAMPLE: Interior angles 30° and 70° : exterior = $30^\circ + 70^\circ = 100^\circ$

A) 80°	B) ★ 100°
C) 120°	D) 280°

Q20. Geometry | ■ Tricky

MEMORY KEY ■ SURFACE AREA (Rectangular Prism): $SA = 2(lw + lh + wh)$ | '2 of each face pair'

A gift box is 5 cm long, 3 cm wide, 4 cm tall. How much wrapping paper (surface area) is needed?

QUICK EXAMPLE: $l=2, w=3, h=4$: $SA = 2(2 \times 3 + 2 \times 4 + 3 \times 4) = 2(6 + 8 + 12) = 52 \text{ cm}^2$

A) 60 cm^2	B) 47 cm^2
C) ★ 94 cm^2	D) 120 cm^2

ANSWER KEY

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

★ = Correct answer indicated in choices above