

# Math Mastery Workbook

Pre-Algebra & Geometry · Self-Study Edition · 20 Problems

---

## Part 1 — Pre-Algebra

---

### PROBLEM 01

[ Order of Operations ]

Evaluate the expression.

$$3 + 4 \times 2 - 2 + 1$$

Key: PEMDAS: Parentheses > Exponents > Multiply/Divide > Add/Subtract

Answer = \_\_\_\_\_

---

### PROBLEM 02

[ Integer Operations ]

Simplify the expression. [Careful: two negatives!]

$$-3 \times (-4) / (-2) + (-4)$$

Key: SAME signs -> (+) DIFFERENT signs -> (-)

Answer = \_\_\_\_\_

---

### PROBLEM 03

[ Solving Equations ]

Solve for x.

$$3x - 4 = 11$$

Key: BALANCE: do the same to both sides

x = \_\_\_\_\_

---

### PROBLEM 04

[ Ratios & Proportions ]

Solve the proportion.

$$4/x = 2/30$$

Key: CROSS-MULTIPLY:  $a/b = c/d \Rightarrow a*d = b*c$

x = \_\_\_\_\_

---

### PROBLEM 05

[ Percentages ]

Find the value. (Change % to decimal first!)

What is 15% of 200?

Key: IS/OF rule: 'is' = equals, 'of' = multiply, '%' = divide by 100

Answer = \_\_\_\_\_

---

### PROBLEM 06

[ Inequalities ]

Solve for x. Watch the sign direction!

$$-2x \leq 4$$

Key: FLIP rule: dividing/multiplying by NEGATIVE flips the inequality

$$x \geq \underline{\hspace{2cm}}$$

---

**PROBLEM 07**

[ FOIL / Distributive ]

Expand and simplify.

$$(x + 2)(x - 3)$$

Key: FOIL: First . Outer . Inner . Last

Answer =  $\underline{\hspace{2cm}}$

---

**PROBLEM 08**

[ Exponent Rules ]

Simplify.

$$2^3 \times 2^{(-1)}$$

Key: SAME base -> ADD exponents:  $a^m \cdot a^n = a^{(m+n)}$

Answer =  $\underline{\hspace{2cm}}$

---

**PROBLEM 09**

[ GCF ]

Find the Greatest Common Factor.

GCF of 12 and 15

Key: GCF = biggest number that divides BOTH evenly

GCF =  $\underline{\hspace{2cm}}$

---

**PROBLEM 10**

[ Slope ]

Find the slope of the line through the two points.

Points: (1, 3) and (3, 7)

Key: RISE over RUN:  $m = (y_2 - y_1) / (x_2 - x_1)$

m =  $\underline{\hspace{2cm}}$

---

---

## Part 2 — Geometry

---

**PROBLEM 11**

[ Complementary Angles ]

Find the missing angle. Two angles are complementary.

One angle = 40 degrees. Find the other.

Key: Complementary = Corner (90 deg) Supplementary = Straight (180 deg)

Angle =  $\underline{\hspace{2cm}}$

---

**PROBLEM 12**

[ Triangle Angle Sum ]

What is the sum of all interior angles of ANY triangle?

Angle A + Angle B + Angle C = ?

Key: TRIANGLE SUM = always 180 degrees, no exceptions

Sum = \_\_\_\_\_

---

**PROBLEM 13**

[ Pythagorean Theorem ]

Find the hypotenuse c.

Right triangle:  $a = 3$ ,  $b = 4$

Key:  $a^2 + b^2 = c^2$  (classic 3-4-5 triple)

c = \_\_\_\_\_

---

**PROBLEM 14**

[ Perimeter ]

Find the perimeter of the rectangle.

Rectangle: length = 10, width = 4

Key:  $P = 2l + 2w$  ('two lengths + two widths')

P = \_\_\_\_\_

---

**PROBLEM 15**

[ Area of Triangle ]

Find the area.

Triangle: base = 8, height = 6

Key:  $A = (1/2) \times \text{base} \times \text{height}$

A = \_\_\_\_\_

---

**PROBLEM 16**

[ Polygon Angle Sum ]

Find the sum of interior angles of a quadrilateral.

$(n - 2) \times 180$  degrees, where  $n$  = number of sides

Key: Quad:  $(4-2) \times 180 = ?$

Sum = \_\_\_\_\_

---

**PROBLEM 17**

[ Circumference ]

Find the circumference. Use  $\pi = 3.14$ .

Circle with diameter  $d = 24$

Key:  $C = \pi \times d$  (diameter!) or  $C = 2 \times \pi \times r$  (radius!)

C = \_\_\_\_\_

---

**PROBLEM 18**

[ Congruence vs. Similarity ]

Fill in the blank with: congruent OR similar

Same shape + Same size = \_\_\_\_\_

Key: Congruent ( $\cong$ ) = identical Similar ( $\sim$ ) = proportional copy

Word: \_\_\_\_\_

---

**PROBLEM 19**

[ Parallel Lines ]

Two parallel lines cut by a transversal. Find the missing angle.

One alternate interior angle = 70 degrees. Find its partner.

Key: ALT. INTERIOR angles = EQUAL (Z-shape pattern)

Angle = \_\_\_\_\_

---

**PROBLEM 20**

[ Volume ]

Find the volume of the rectangular prism.

$$l = 5, w = 6, h = 5$$

Key:  $V = l \times w \times h$

V = \_\_\_\_\_

## Answer Key

---

Check your answers below. Each answer is listed by problem number.

Q01: 12	Q02: -10	Q03: 5	Q04: 60
Q05: 30	Q06: -2	Q07: $x^2 - x - 6$	Q08: 4
Q09: 3	Q10: 2	Q11: 50	Q12: 180
Q13: 5	Q14: 28	Q15: 24	Q16: 360
Q17: 75.4	Q18: congruent	Q19: 70	Q20: 150