

# MATH MASTERY WORKSHEET

Algebra 1 & Geometry — Core Concepts · Self-Study Edition

20 Multiple Choice Questions · Memory Points · Answer Key

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UNIT 1 · ALGEBRA 1

## Word Problems

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**Q01** Linear Equations · Setting Up

Maya has \$45. She earns \$8 per hour babysitting. She wants to buy a jacket that costs \$93. Which equation correctly represents the number of hours,  $h$ , she needs to work?

■ **KEY:** 'has' = start value · 'earns' = rate x variable · 'wants' = goal

A)  $45h + 8 = 93$

C)  $8h + 45 = 93$

B)  $8h - 45 = 93$

D)  $8 + 45h = 93$

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**Q02** Two-Step Equations · Tricky Wording

Three times a number decreased by 7 equals 20. What is the number?

*[Watch: 'decreased by' means subtract FROM the expression, not from 7.]*

■ **TRANSLATE:** 'three times  $x$  decreased by 7'  $\implies 3x - 7$  (NOT  $7 - 3x$ )

A)  $x = 4$

C)  $x = 13$

B)  $x = 9$

D)  $x = 27/3$

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**Q03** Inequalities · Real-World Context

A roller coaster requires riders to be at least 48 inches tall. Leo is 42 inches. Which inequality shows how many more inches  $x$  he needs to grow?

■ 'at least' =  $\geq$  · 'at most' =  $\leq$  · 'more than' =  $>$  · 'less than' =  $<$

A)  $42 + x > 48$

C)  $x > 6$

B)  $42 + x \geq 48$

D)  $42 - x \geq 48$

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**Q04** Rate & Distance · Classic Trap

Two trains leave the same station traveling in opposite directions. Train A = 60 mph, Train B = 40 mph. After how many hours are they 300 miles apart?

■ **OPPOSITE directions**  $\rightarrow$  **ADD speeds:**  $(\text{rate1} + \text{rate2}) \times \text{time} = \text{total distance}$

A) 3 hours

C) 7.5 hours

B) 5 hours

D) 2.5 hours

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**Q05** Consecutive Integers · Number Tricks

The sum of three consecutive even integers is 78. What is the largest of the three?

[Watch: 'consecutive even' means they differ by 2, not 1!]

■ **CONSECUTIVE EVEN:**  $x, x+2, x+4$  · **CONSECUTIVE ODD:** same pattern  $x, x+2, x+4$

- A) 24  
B) 26  
C) 28  
D) 30

**Q06** Mixture Problems · Percent Confusion

A store sells nuts. Type A = \$4/lb, Type B = \$7/lb. You want 15 lbs of a blend at \$5/lb. How many pounds of Type A are needed?

■ **MIXTURE:**  $(\text{price1})(\text{qty1}) + (\text{price2})(\text{qty2}) = (\text{blended price})(\text{total qty})$

- A) 5 lbs  
B) 8 lbs  
C) 10 lbs  
D) 12 lbs

**Q07** Slope-Intercept · Reading Graphs

A phone plan: \$20 monthly fee + \$0.05 per text. Which equation gives total cost C for t texts? What does the y-intercept represent?

■  **$y = mx + b$**  ·  $m = \text{rate (per unit)}$  ·  $b = \text{starting value (when } x = 0)$

- A)  $C = 20t + 0.05$ ;  $b = 0.05$   
B)  $C = 0.05t + 20$ ;  $b = 20$ , fixed fee  
C)  $C = 0.05t + 20$ ;  $b = 0.05$ , per-text cost  
D)  $C = 20t$ ; no y-intercept

**Q08** Systems of Equations · Age Problem

Emma is 3 times as old as her brother Jake. In 4 years, she will be twice as old as Jake. How old is Jake now?

[Watch: 'In 4 years' applies to BOTH ages.]

■ **'In n years'** → add n to BOTH sides:  $(\text{Emma}+n) = 2(\text{Jake}+n)$

- A) 4 years old  
B) 6 years old  
C) 8 years old  
D) 12 years old

**Q09** Proportion · Unit Rate

A car travels 150 miles in 2.5 hours. At the same rate, how far does it travel in 4 hours?

■ **UNIT RATE first:**  $\text{miles} / \text{hours} = \text{mph}$  → then multiply by new time

- A) 200 miles  
B) 220 miles  
C) 240 miles  
D) 260 miles

**Q10** Percent Change · The Sneaky One

A shirt costs \$80. It goes on sale for 25% off. Then the sale price is increased by 25%. What is the final price?

*[Most students say \$80 — they are wrong!]*

■ **-25% then +25% is NOT the same price! Percentages apply to DIFFERENT bases**

- |            |            |
|------------|------------|
| A) \$80.00 | C) \$82.50 |
| B) \$75.00 | D) \$70.00 |

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UNIT 2 · GEOMETRY

## Core Concepts

**Q11** Triangle Angles · Interior Sum

In triangle ABC, angle A = 55 degrees and angle B = 78 degrees. What is the measure of angle C?

■ **TRIANGLE SUM THEOREM: angle A + angle B + angle C = 180 degrees (always)**

- |               |               |
|---------------|---------------|
| A) 37 degrees | C) 47 degrees |
| B) 43 degrees | D) 52 degrees |

**Q12** Pythagorean Theorem · Missing Side

A right triangle has legs of length 5 and 12. What is the length of the hypotenuse?

■  **$a^2 + b^2 = c^2$  · Hypotenuse is ALWAYS c (longest side, opposite right angle)**

- |       |       |
|-------|-------|
| A) 11 | C) 15 |
| B) 13 | D) 17 |

**Q13** Area of a Triangle · Tricky Height

A triangle has a base of 14 cm and a height of 9 cm. What is its area?

*[Watch: Many students forget the 1/2!]*

■  **$A = (1/2) \times \text{base} \times \text{height}$  · Think: triangle is HALF of a rectangle**

- |                        |                         |
|------------------------|-------------------------|
| A) 126 cm <sup>2</sup> | C) 46 cm <sup>2</sup>   |
| B) 63 cm <sup>2</sup>  | D) 94.5 cm <sup>2</sup> |

**Q14** Circle Area · Radius vs. Diameter

A circle has a diameter of 10 cm. What is its area? (Use  $\pi = 3.14$ )

*[Watch: The problem gives diameter — you must halve it first!]*

■  **$A = \pi \cdot r^2 \cdot r = d / 2$  · ALWAYS halve diameter before squaring**

- |                         |                         |
|-------------------------|-------------------------|
| A) 314 cm <sup>2</sup>  | C) 78.5 cm <sup>2</sup> |
| B) 31.4 cm <sup>2</sup> | D) 157 cm <sup>2</sup>  |

**Q15** Supplementary & Complementary Angles

Angle X and angle Y are supplementary. Angle X is 38 degrees more than angle Y. What is angle X?

*[Supplementary = sum is 180 degrees. Complementary = sum is 90 degrees.]*

■ **S-U-pplementary = 1-8-0 · C-O-mplementary = 9-0 (C before S, 90 before 180)**

- |                |                |
|----------------|----------------|
| A) 71 degrees  | C) 64 degrees  |
| B) 109 degrees | D) 116 degrees |

**Q16** Volume of a Rectangular Prism

A fish tank is 40 cm long, 25 cm wide, and 30 cm tall. If the tank is filled 80% full, how many cubic centimeters of water does it hold?

■  **$V = l \times w \times h$  · then multiply by percent as decimal: 80% = x 0.80**

- |                           |                           |
|---------------------------|---------------------------|
| A) 24,000 cm <sup>3</sup> | C) 25,000 cm <sup>3</sup> |
| B) 30,000 cm <sup>3</sup> | D) 27,500 cm <sup>3</sup> |

**Q17** Parallel Lines & Transversals · Angle Pairs

Two parallel lines are cut by a transversal. One angle measures 65 degrees. What is the measure of the co-interior (same-side interior) angle?

*[Watch: Co-interior angles are supplementary, NOT equal!]*

■ **Alternate angles = EQUAL · Co-interior angles = SUPPLEMENTARY (sum to 180)**

- |               |                |
|---------------|----------------|
| A) 65 degrees | C) 115 degrees |
| B) 90 degrees | D) 125 degrees |

**Q18** Perimeter of Composite Shapes

An L-shaped figure is formed by removing a 3x4 rectangle from the corner of a 7x8 rectangle. What is the perimeter of the L-shape?

■ **COMPOSITE PERIMETER: trace ONLY outside edges · cut adds edges, doesn't remove outer ones**

- |             |             |
|-------------|-------------|
| A) 28 units | C) 34 units |
| B) 30 units | D) 38 units |

