SELF-STUDY WORKBOOK

Math Mastery

Pre-Algebra & Geometry · 20 Word Problems

Name: _____ **Date:** _____

Score: _____ / 20 **Time:** _____

Chapter 1 · Pre-Algebra

Variables, equations, ratios, proportions, and number sense.

■ QUICK MEMORY POINTS — PRE-ALGEBRA

UNKNOWN = variable | IS / EQUALS = = | OF = × | PER = ÷ | MORE THAN = + | LESS THAN = – | TWICE = × 2 | CONSECUTIVE = n, n+1, n+2

Q 01 **Variables**

Emma has some stickers. After she gives 7 stickers to her friend and receives 3 more from her mom, she has 18 stickers. How many stickers did Emma start with?

Hint: Let x = starting stickers. Write: x – 7 + 3 = 18

```
x – 7 + 3 = 18
```

(A) 20 stickers

(B) 22 stickers

(C) 14 stickers

(D) 28 stickers

Q 02 **Ratios**

In a class, the ratio of boys to girls is 3 : 5. If there are 24 boys, how many students are in the class altogether?

Hint: 3 parts = 24 boys → 1 part = ? → find girls, then total.

(A) 56 students

(B) 64 students

(C) 48 students

(D) 72 students

Q 03 **■ Tricky — Consecutive Integers**

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

Hint: Trap: 78 ÷ 3 = 26 is the MIDDLE, not the largest!

```
n + (n+1) + (n+2) = 78
```

(A) 26

(B) 27

(C) 28

(D) 25

Q 04 **Percentages**

A jacket costs $80. It is on sale for 25% off. If sales tax is 10%, what is the final price?

Hint: Apply discount FIRST, then add tax on the discounted price.

(A) $60.00
(B) $66.00
(C) $72.00
(D) $54.00

Q 05 **■ Tricky — Speed**

A train travels at 60 mph. A car travels the same distance but takes 1.5 times longer. What is the car's speed?

Hint: Speed = Distance ÷ Time. More time → less speed. Speed × time = constant.

(A) 40 mph
(B) 45 mph
(C) 90 mph
(D) 50 mph

Q 06 **Proportions**

A recipe needs 2 cups of flour for every 3 dozen cookies. How many cups of flour are needed for 12 dozen cookies?

Hint: Set up a proportion: 2/3 = x/12, then cross-multiply.

```
2/3 = x/12
```

(A) 6 cups
(B) 8 cups
(C) 7 cups
(D) 9 cups

Q 07 **■ Tricky — Age Problem**

Lucas is twice as old as Maya. In 6 years, Lucas will be 1.5 times as old as Maya. How old is Maya NOW?

Hint: Add 6 to BOTH ages in the future equation!

```
Now: Lucas=2m | Future: 2m+6 = 1.5(m+6)
```

(A) 6 years old
(B) 12 years old
(C) 9 years old
(D) 18 years old

Q 08 **Integers**

The temperature at 6 AM was –8°C. By noon it rose 15°C, then dropped 4°C. What was the final temperature?

Hint: Work left to right with signed numbers: –8 + 15 – 4 = ?

(A) 3°C
(B) 7°C
(C) –1°C
(D) 11°C

Q 09 ■ Tricky — System of Equations

A store sells pens for $2 and notebooks for $5. Jake buys 10 items and spends exactly $29. How many pens did he buy?

Hint: Let p = pens, n = notebooks. Write 2 equations.

`p + n = 10 and 2p + 5n = 29`

(A) 3 pens

(B) 5 pens

(C) 7 pens

(D) 4 pens

Q 10 ■ Tricky — Multi-step Equation

A number is multiplied by 4, then 9 is subtracted, and the result is doubled. The final answer is 46. What is the original number?

Hint: Build equation step by step. Don't forget to distribute the 'doubled'.

`2 × (4x – 9) = 46`

(A) 8

(B) 7

(C) 5

(D) 9

Chapter 2 · Geometry

Area, perimeter, angles, Pythagorean theorem, and spatial reasoning.

■ QUICK MEMORY POINTS — GEOMETRY

AREA = space inside | PERIMETER = outside edge | Triangle Area = (1/2) x b x h | Circle Area = pi x r^2 | a^2 + b^2 = c^2 (right triangle) | Triangle angles = 180° | Complementary = 90° | Supplementary = 180°

Q 11 **Area vs. Perimeter**

A rectangular garden is 12 meters long and 7 meters wide. You want to put a fence around the ENTIRE garden. How many meters of fence do you need?

Hint: Fence = Perimeter, NOT area! P = 2(l + w)

(A) 84 meters

(B) 38 meters

(C) 19 meters

(D) 42 meters

Q 12 ■ **Tricky — Angle Ratios**

In a triangle, the angles are in the ratio 2 : 3 : 4. What is the measure of the LARGEST angle?

Hint: All angles in a triangle ALWAYS add up to 180°.

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2x + 3x + 4x = 180°
```

(A) 60°

(B) 72°

(C) 80°

(D) 90°

Q 13 **Pythagorean Theorem**

A ladder leans against a wall. The bottom is 6 feet from the wall, the ladder reaches 8 feet up the wall. How long is the ladder?

Hint: Draw a right triangle. Use a^2 + b^2 = c^2.

```
6^2 + 8^2 = c^2
```

(A) 10 feet

(B) 12 feet

(C) 14 feet

(D) 7 feet

Q 14 ■ **Tricky — Circle Area**

A circular pizza has a diameter of 14 inches. What is the area? (pi ≈ 3.14)

Hint: Trap: Formula uses RADIUS not diameter. r = d ÷ 2 = 7

```
A = pi x r^2 = 3.14 x 7^2
```

(A) 615.44 in^2

(B) 153.86 in^2

(C) 43.96 in^2

(D) 87.92 in^2

Q 15 **Supplementary Angles**

Two angles are supplementary. One angle is THREE TIMES the other. What are the two angle measures?

Hint: Supplementary = adds to 180°.

`x + 3x = 180°`

(A) 30° and 150°

(B) 45° and 135°

(C) 22.5° and 67.5°

(D) 60° and 120°

Q 16 **■ Tricky — Rectangle Area**

A rectangle has a perimeter of 56 cm. Its length is 8 cm MORE than its width. What is the AREA?

Hint: Two-step! Find dimensions first, THEN calculate area.

`2(w + w + 8) = 56 → find w, then A = l x w`

(A) 160 cm^2

(B) 180 cm^2

(C) 168 cm^2

(D) 192 cm^2

Q 17 **Volume**

A rectangular box is 10 cm long, 4 cm wide, and 5 cm tall. How much water can it hold in cm^3?

Hint: Volume = length x width x height (multiply ALL three!)

(A) 200 cm^3

(B) 190 cm^3

(C) 180 cm^3

(D) 210 cm^3

Q 18 **■ Tricky — Pythagorean + Area**

A right triangle has legs of 5 and 12. A square is drawn on the outside of the hypotenuse. What is the area of that square?

Hint: Tip: Area of square = c^2. You don't need to find sqrt first!

`5^2 + 12^2 = c^2 → Area = c^2`

(A) 169 sq units

(B) 13 sq units

(C) 144 sq units

(D) 119 sq units

Q 19 **Composite Shapes**

An L-shaped floor is made of two rectangles: one is 6 m × 4 m and the other is 3 m × 2 m. What is the total area?

Hint: Composite = add both areas separately, then combine.

(A) 28 m^2

(B) 30 m^2

(C) 36 m^2

(D) 24 m^2

Q 20 ■ **Tricky — Circle in Square**

A circle is inscribed inside a square with side length 10 cm. What is the area INSIDE the square but OUTSIDE the circle? (pi ≈ 3.14)

Hint: Diameter = side of square = 10, so r = 5. Answer = Area(square) – Area(circle).

`Area = 10^2 – pi x 5^2 = 100 – 78.5`

(A) 21.5 cm^2

(B) 78.5 cm^2

(C) 36.0 cm^2

(D) 15.0 cm^2

Answer Key

Chapter 1 · Pre-Algebra

Q01	B (22 stickers)	**Q11**	B (38 meters)
Q02	B (64 students)	**Q12**	C (80°)
Q03	C (28)	**Q13**	A (10 feet)
Q04	B ($66.00)	**Q14**	B (153.86 in²)
Q05	A (40 mph)	**Q15**	B (45° and 135°)
Q06	B (8 cups)	**Q16**	B (180 cm²)
Q07	A (6 years old)	**Q17**	A (200 cm³)
Q08	A (3°C)	**Q18**	A (169 sq units)
Q09	C (7 pens)	**Q19**	B (30 m²)
Q10	A (8)	**Q20**	A (21.5 cm²)