PRE-ALGEBRA & GEOMETRY

Word Problem Practice Workbook

20 Essential Problems · Answer Key Included

Name: _____ Date: _____ Score: _____/ 20

SECTION A — PRE-ALGEBRA

Q1 · PRE-ALGEBRA · Variables & Expressions

■ *LET x = unknown — name the unknown first*

Sam has some apples. After giving away 7 apples to his friend, he has 15 apples left.
Which equation represents this situation, and how many apples did Sam start with?

A) x – 7 = 15 → x = 22
B) x + 7 = 15 → x = 8
C) 7x = 15 → x ≈ 2.1
D) x ÷ 7 = 15 → x = 105

Q2 · PRE-ALGEBRA · Order of Operations

■ *PEMDAS — Parentheses → Exponents → Multiply/Divide → Add/Subtract*

A baker makes 3 batches of cookies with 12 cookies each, then eats 4 cookies.
His friend adds 2 × 5 more cookies. Which expression gives the total, and what is the answer?

A) 3×12 – 4 + 2×5 = 42
B) (3×12 – 4 + 2) × 5 = 90
C) 3 × (12 – 4) + 2 × 5 = 34
D) 3 × 12 – (4 + 2) × 5 = 6

Q3 · PRE-ALGEBRA · Solving One-Step Equations

■ *INVERSE operation — do the opposite to both sides*

A number multiplied by 6 gives 54. What is the number?
★ Careful — do NOT subtract 6. What is the inverse of multiplication?

A) 9
B) 48
C) 60
D) 324

Q4 · PRE-ALGEBRA · Ratios & Proportions

■ *CROSS MULTIPLY — a/b = c/d → ad = bc*

A recipe uses 2 cups of flour for every 3 cups of sugar.
If you want to use 9 cups of sugar, how many cups of flour do you need?

A) 6 cups
B) 4.5 cups
C) 13.5 cups
D) 27 cups

Q5 · PRE-ALGEBRA · Negative Numbers & Integers

■ *NUMBER LINE — left = smaller, right = bigger*

The temperature on Monday was –3°C. By Thursday it dropped another 8 degrees.
On Friday it rose 5 degrees. What was the temperature on Friday?

A) –6°C
B) –11°C
C) 0°C
D) 10°C

Q6 · PRE-ALGEBRA · Two-Step Equations

■ *UNDO in REVERSE order — subtract/add first, then divide/multiply*

Maria thinks of a number, multiplies it by 4, then adds 7. The result is 31.
What was her original number? ★ Watch out: do NOT divide by 4 first!

A) 6
B) 9.5
C) 3
D) 11

Q7 · PRE-ALGEBRA · Percent Problems

■ *IS / OF = % / 100 → "is" = part, "of" = whole*

A jacket originally costs $80. It is on sale for 25% off.
What is the sale price? ★ 25% off means you PAY 75%!

A) $60
B) $20
C) $55
D) $100

Q8 · PRE-ALGEBRA · Inequalities

■ *FLIP sign when dividing/multiplying by a NEGATIVE number*

You need to earn at least $100 this week. You already have $37 and earn $9/hour.
What is the minimum number of hours you must work?

A) 7 hours
B) 6 hours
C) 8 hours
D) 11 hours

Q9 · PRE-ALGEBRA · Rates & Unit Conversion

■ *UNIT FRACTIONS — multiply by (conversion/1) to cancel units*

A car travels at 60 miles per hour. How many miles does it travel in 2.5 hours?

If 1 mile ≈ 1.6 km, approximately how far is that in kilometers?

A) 150 miles / 240 km
B) 120 miles / 192 km
C) 150 miles / 93.75 km
D) 62.5 miles / 100 km

Q10 · PRE-ALGEBRA · Combining Like Terms

■ *LIKE TERMS have same variable — 3x + 5x = 8x, but 3x + 5 ≠ 8x*

Alex has 3n baseball cards and 5 bonus cards. Ben has 2n baseball cards and 8 bonus cards.

They combine collections. If n = 4, how many total cards do they have?

★ First simplify the expression, THEN substitute.

A) 33 cards
B) 28 cards
C) 37 cards
D) 20 cards

SECTION B — GEOMETRY

Q11 · GEOMETRY · Perimeter of Rectangles
■ *P = 2(l + w) — add length + width, then double*

A rectangular garden has length 14 m and width 9 m.
Fencing costs $5 per meter. How much to fence the entire garden?
★ Fencing = perimeter, NOT area!

A) $230
B) $126
C) $115
D) $252

Q12 · GEOMETRY · Area of Triangles
■ *A = ½ × b × h — the ½ trips everyone up!*

A triangular sail has base 8 feet and height 15 feet.
What is the area of the sail?
★ Do NOT use 8 × 15 directly — triangles need the ½!

A) 60 ft²
B) 120 ft²
C) 46 ft²
D) 30 ft²

Q13 · GEOMETRY · Area of Circles
■ *A = πr² → radius = diameter ÷ 2*

A circular pizza has diameter 14 inches. What is the approximate area?
Use π ≈ 3.14. ★ Diameter vs radius trap!

A) 153.86 in²
B) 43.96 in²
C) 615.44 in²
D) 196 in²

Q14 · GEOMETRY · Pythagorean Theorem
■ *a² + b² = c² → c is always the LONGEST side*

A ladder leans against a wall. The base is 6 feet from the wall
and the top reaches 8 feet up the wall. How long is the ladder?

A) 10 feet
B) 14 feet
C) 7 feet
D) √28 feet

Q15 · GEOMETRY · Complementary & Supplementary Angles

■ *C = 90° (Corner), S = 180° (Straight line)*

Two supplementary angles measure (3x + 10)° and (x + 30)°.

Find x and both angle measures.

★ Supplementary = 180°, NOT 90°!

A) x=35; 115° and 65°
B) x=10; 40° and 40°
C) x=35; 105° and 75°
D) x=20; 70° and 50°

Q16 · GEOMETRY · Volume of Rectangular Prisms

■ *V = l × w × h — all three dimensions*

A fish tank is 50 cm long, 25 cm wide, 30 cm tall.

Water fills 80% of the tank. How many cm³ of water are in the tank?

A) 30,000 cm³
B) 37,500 cm³
C) 24,000 cm³
D) 3,750 cm³

Q17 · GEOMETRY · Coordinate Geometry

■ *Distance = √[(x■–x■)² + (y■–y■)²]*

Two friends live at A(1, 2) and B(4, 6) on a map (each unit = 1 km).

What is the straight-line distance between them?

A) 5 km
B) 7 km
C) 3 km
D) √7 km

Q18 · GEOMETRY · Similar Triangles & Scale

■ *RATIO stays constant — corresponding sides are proportional*

A 6-foot person casts a 4-foot shadow. At the same time, a tree casts a 14-foot shadow.

How tall is the tree? ★ The sun angle creates similar triangles!

A) 21 feet
B) 16 feet
C) 9.3 feet
D) 35 feet

Q19 · GEOMETRY · Interior Angles of Polygons

■ *Sum = (n–2) × 180° → n = number of sides*

A hexagonal tile has 6 sides. What is the sum of all interior angles?

If all angles are equal, what is each angle measure?

A) 720° total; 120° each
B) 540° total; 90° each
C) 1080° total; 180° each
D) 360° total; 60° each

Q20 · GEOMETRY · Circumference & Arc Length

■ *C = πd (circumference uses DIAMETER directly)*

A wheel has diameter 20 inches. If it makes 10 full rotations, how far (in inches) has it traveled? Use $\pi \approx 3.14$.

★ One rotation = one circumference!

A) 628 inches
B) 314 inches
C) 1,256 inches
D) 200 inches

ANSWER KEY

Q1. A — x – 7 = 15 → x = 22. Translate 'after giving away 7' as subtraction from original.

Q2. A — 3×12 – 4 + 2×5. By PEMDAS multiply first: 36 – 4 + 10 = 42.

Q3. A — 6n = 54 → divide both sides by 6 → n = 9. Inverse of × is ÷.

Q4. A — 2/3 = x/9 → cross multiply → 3x = 18 → x = 6 cups.

Q5. A — –3 – 8 = –11 (dropped), then –11 + 5 = –6°C.

Q6. A — 4n + 7 = 31 → subtract 7 → 4n = 24 → divide by 4 → n = 6.

Q7. A — 25% of 80 = $20 discount. Sale price = 80 – 20 = $60. Or: 75% × 80 = $60.

Q8. A — 37 + 9h ≥ 100 → 9h ≥ 63 → h ≥ 7. Minimum is 7 hours.

Q9. A — 60 × 2.5 = 150 miles. Then 150 × 1.6 = 240 km.

Q10. A — (3n+5)+(2n+8) = 5n+13. At n=4: 5(4)+13 = 20+13 = 33 cards.

Q11. A — P = 2(14+9) = 46 m. Cost = 46 × $5 = $230.

Q12. A — A = ½ × 8 × 15 = 60 ft². Don't forget the ½!

Q13. A — r = 7 in. A = 3.14 × 49 ≈ 153.86 in². Use radius, not diameter!

Q14. A — $6^2 + 8^2 = c^2$ → 36+64 = 100 → c = 10 ft. Classic 3-4-5 × 2.

Q15. A — (3x+10)+(x+30)=180 → 4x=140 → x=35. Angles: 115° and 65°.

Q16. A — V = 50×25×30 = 37,500. Water = 0.8×37,500 = 30,000 cm³.

Q17. A — $d = \sqrt{[(4-1)^2+(6-2)^2]} = \sqrt{[9+16]} = \sqrt{25} = 5$ km.

Q18. A — 6/4 = h/14 → 4h=84 → h=21 feet.

Q19. A — (6–2)×180 = 720°. Each angle = 720÷6 = 120°.

Q20. A — C = 3.14×20 = 62.8 in. × 10 rotations = 628 inches.