Pre-Algebra & Geometry

20 Essential Practice Problems · Middle School Grade 6–8

PRE-ALGEBRA

■ ***ISOLATE*** *→ move numbers, keep variable alone*

[One-Step Equations]

Q1. Solve for x:

x + 14 = 31

■ *Tricky: do the OPPOSITE operation — subtract 14, don't add it.*

A. x = 45

B. x = 17

C. x = 21

D. x = 14

■ ***DIVIDE BOTH*** *→ 3x = 24 means x = 24 ÷ 3*

[One-Step Equations]

Q2. Solve for n:

7n = 63

■ *Tricky: the coefficient means multiply — undo it by dividing both sides.*

A. n = 56

B. n = 441

C. n = 9

D. n = 7

■ ***TWO-STEP*** *→ undo + or – first, then × or ÷*

[Two-Step Equations]

Q3. Solve for x:

2x – 5 = 11

■ *Tricky: add 5 to both sides FIRST, then divide by 2. Don't divide first!*

A. x = 3

B. x = 8

C. x = 6

D. x = 11

■ ***RATIO = FRACTION*** *→ 3:4 means 3/4*

[Ratios & Proportions]

Q4. A bag has red and blue marbles in ratio 3 : 5.

If there are 24 red marbles, how many blue marbles are there?

■ *Tricky: set up a proportion 3/5 = 24/? and cross-multiply.*

A. 32

C. 40

B. 15 D. 8

■ ***PERCENT*** *→ IS / OF × 100*

[Percents]

Q5. A jacket costs $80 and is on sale for 35% off.

What is the sale price?

■ *Tricky: $28 is the discount amount, NOT the price. Subtract from $80.*

A. $28 C. $45

B. $52 D. $108

■ ***DISTRIBUTE*** *→ a(b+c) = ab + ac*

[Distributive Property]

Q6. Simplify:

3(2x + 4) – 5

■ *Tricky: multiply 3 by EVERY term inside — including the constant 4.*

A. 6x + 7 C. 6x + 17

B. 6x + 4 D. 5x + 7

■ ***INEQUALITY FLIP*** *→ multiply/divide by negative → flip the sign*

[Inequalities]

Q7. Solve:

$-3x + 6 \leq 18$

■ *Tricky: dividing by –3 FLIPS the inequality sign ≤ becomes ≥.*

A. $x \leq -4$ C. $x \geq 8$

B. $x \leq 4$ D. $x \geq -4$

■ ***RATE × TIME = DISTANCE*** *→ d = r × t*

[Word Problem — Rate]

Q8. Maria drives at 60 mph for 2.5 hours, then at 40 mph for 1 hour.

What is the total distance?

■ *Tricky: calculate each leg separately: 60×2.5=150, 40×1=40. Sum=190.*

A. 100 miles C. 190 miles

B. 175 miles D. 150 miles

■ ***LIKE TERMS*** *→ same variable + same exponent = can combine*

[Combining Like Terms]

Q9. Simplify:

$5x^2 + 3x – 2x^2 + 7 – x$

■ *Tricky: x^2 and x are NOT like terms — never combine different powers!*

A. $3x^2 + 4x + 7$

B. $3x^2 + 2x + 7$

C. $7x^2 + 4x + 7$

D. $3x + 7$

■ ***CROSS MULTIPLY*** *→ $a/b = c/d \rightarrow ad = bc$*

[Proportions]

Q10. A recipe needs 2 cups of flour for every 3 cookies.

How many cups are needed for 24 cookies?

■ *Tricky: $2/3 = f/24 \rightarrow 3f = 48 \rightarrow f = 16$. Don't multiply 2×24 directly.*

A. 8 cups

B. 36 cups

C. 16 cups

D. 12 cups

GEOMETRY

■ ***PYTHAGOREAN*** *→ $a^2 + b^2 = c^2$ (c = longest side)*

[Pythagorean Theorem]

Q11. Find the missing hypotenuse:

Legs: $a = 9$, $b = 12 \rightarrow c = ?$

■ *Tricky: SQUARE each leg first, then add, then take the square root.*

A. 21

B. 15

C. 14.1

D. 3

■ ***AREA CIRCLE*** *→ $A = \pi r^2$ (r = radius, NOT diameter!)*

[Circles — Area]

Q12. A circle has a diameter of 10 cm.

What is its area? ($\pi \approx 3.14$)

■ *Tricky: diameter given! Radius = $10 \div 2 = 5$. Using $r=10$ gives 4× too big.*

A. 314 cm^2

B. 31.4 cm^2

C. 78.5 cm^2

D. 62.8 cm^2

■ ***TRIANGLE ANGLES*** *→ always add up to 180°*

[Angles in a Triangle]

Q13. A triangle has angles of 47° and 83°.

What is the third angle?

■ *Tricky: subtract BOTH angles: $180 – 47 – 83 = 50°$.*

A. 97°

B. 133°

C. 60°

D. 50°

■ ***VOLUME BOX*** → *V = l × w × h*

[Volume — Rectangular Prism]

Q14. A rectangular box is 8 cm long, 5 cm wide, and 3 cm tall.

What is its volume?

■ *Tricky: multiply ALL THREE dimensions. Don't calculate surface area!*

A. 120 cm³
C. 79 cm³
B. 158 cm²
D. 16 cm³

■ ***COMPLEMENTARY = 90° | SUPPLEMENTARY = 180°***

[Angle Relationships]

Q15. Two angles are supplementary. One angle is 112°.

What is the other angle?

■ *Tricky: supplementary = 180°, complementary = 90°. 180 – 112 = 68°.*

A. 22°
C. 248°
B. 68°
D. 112°

■ ***PERIMETER*** → *add ALL sides (2 lengths + 2 widths for rectangle)*

[Perimeter]

Q16. A rectangle has length 14 m and width 6 m.

What is the perimeter?

■ *Tricky: P = 2(l+w) = 2(20) = 40. A rectangle has TWO of each side.*

A. 84 m
C. 40 m
B. 20 m
D. 48 m

■ ***AREA TRIANGLE*** → *A = ½ × base × height*

[Area — Triangle]

Q17. A triangle has a base of 10 cm and a height of 7 cm.

What is the area?

■ *Tricky: triangle area = HALF of rectangle area. Don't forget the ½!*

A. 70 cm²
C. 17 cm²
B. 35 cm²
D. 34 cm²

■ ***CIRCUMFERENCE*** → *C = πd = 2πr*

[Circles — Circumference]

Q18. A circle has a radius of 7 cm.

What is the circumference? (π ≈ 3.14)

■ *Tricky: given radius → double it first! C = 2 × 3.14 × 7 = 43.96 cm.*

A. 21.98 cm
C. 43.96 cm

B. 153.86 cm

D. 49 cm

■ ***ALTERNATE INTERIOR = equal | CO-INTERIOR = 180°***

[Parallel Lines & Transversal]

Q19. Two parallel lines are cut by a transversal. One angle is 65°.

What is its co-interior (same-side interior) angle?

■ *Tricky: co-interior angles are supplementary (180°). 180 – 65 = 115°.*

A. 65°

C. 25°

B. 115°

D. 295°

■ ***SIMILAR TRIANGLES*** *→ corresponding sides are PROPORTIONAL*

[Similar Triangles]

Q20. Triangle ABC ~ Triangle DEF. AB = 6, BC = 9, DE = 10.

What is the length of EF?

■ *Tricky: scale factor = 10/6 = 5/3. EF = 9 × (5/3) = 15.*

A. 13

C. 5.4

B. 6

D. 15

ANSWER KEY

	Q	Ans	Q	Ans	Q	Ans							
	3	B	4	C	5	B	6	A	7	D	8	C	
	13	D	14	A	15	B	16	C	17	B	18	C	