Math Practice

Pre-Algebra & Geometry · Grade 6–8 · 20 Core Problems

Name: _____ **Score:** _____/ 20

Section A · Pre-Algebra

Q01 Order of Operations · PEMDAS

■ **QUICK RECALL** `PEMDAS: Parentheses → Exponents → Multiply/Divide → Add/Subtract`

Evaluate: $3 + 4 \times 2^2 - (6 \div 3)$

A. 11	B. 17
C. 19	D. 26

Answer: B. 17

Q02 Integer Operations · Negative Numbers

■ **QUICK RECALL** `Subtracting a negative = adding a positive: a − (−b) = a + b`

Simplify: $-8 + 3 - (-5) + (-2)$

A. –12	B. –8
C. –2	D. 2

Answer: C. –2

Q03 One-Step Equations · Word Problems

■ **QUICK RECALL** `ISOLATE x: apply the inverse operation to BOTH sides equally`

A bag of apples costs $x. After buying 3 bags, you spent $19.50.

Which equation is correct, and what is x?

A. x + 3 = 19.50 → x = 16.50	B. 3x = 19.50 → x = 6.50
C. x ÷ 3 = 19.50 → x = 58.50	D. 3x = 19.50 → x = 7.50

Answer: B. 3x = 19.50 → x = $6.50

Q04 Fractions · Division (Keep-Change-Flip)

■ **QUICK RECALL** `Dividing fractions: KEEP · CHANGE ÷ to × · FLIP the second fraction`

Simplify completely: (3/4) ÷ (9/16)

A. 27/64	B. 3/4
C. 4/3	D. 1/3

Answer: C. 4/3

Q05 Ratios & Proportions · Cross-Multiply

■ **QUICK RECALL** `CROSS-MULTIPLY: a/b = c/d means a × d = b × c`

A recipe uses 2 cups of flour for every 3 cups of milk.

How many cups of milk are needed for 5 cups of flour?

A. 5 cups	B. 6.5 cups
C. 7.5 cups	D. 8 cups

Answer: C. 7.5 cups

Q06 Percents · Percent Discount

■ **QUICK RECALL** `35% OFF → Sale price = original × 0.65 (not × 0.35 — that's the discount!)`

A jacket originally costs $120. It is on sale for 35% off.

What is the sale price?

A. $42	B. $72
C. $78	D. $85

Answer: C. $78

Q07 Two-Step Equations

■ **QUICK RECALL** `UNDO in REVERSE order: undo + or − first, THEN undo × or ÷`

Solve for n: 4n − 7 = 21

A. n = 3.5	B. n = 5
C. n = 7	D. n = 14

Answer: C. n = 7

Q08 Exponent Rules · Product & Quotient

■ **QUICK RECALL** `Same base: MULTIPLY → ADD exponents · DIVIDE → SUBTRACT exponents`

Simplify (x ≠ 0): x■ × x³ ÷ x■

A. x^2	B. x■
C. x■	D. x■■

Answer: B. x■

Q09 Inequalities · Flip the Sign Rule

> ■ **QUICK RECALL** `FLIP the inequality sign when you MULTIPLY or DIVIDE by a NEGATIVE number!`

Solve: $-3x + 2 \leq 14$

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

Answer: D. $x \geq -4$

Q10 Distributive Property · Combining Like Terms

> ■ **QUICK RECALL** `DISTRIBUTE first → then COLLECT like terms (same variable + same power)`

Simplify: $3(2x - 4) + 5x - 6$

A. $11x - 10$	B. $6x - 18$
C. $11x + 6$	D. $11x - 18$

Answer: D. $11x - 18$

Section B · Geometry

Q11 Triangle Angle Sum Theorem

> ■ **QUICK RECALL** `TRIANGLE SUM = 180° — always, for every triangle, no exceptions!`

A triangle has angles $(3x + 5)°$, $(x - 5)°$, and $60°$.

Find x, then find the measure of the largest angle.

A. $x = 25°$, largest $= 80°$	B. $x = 30°$, largest $= 95°$
C. $x = 30°$, largest $= 60°$	D. $x = 40°$, largest $= 125°$

Answer: B. $x = 30°$, largest angle $= 95°$

Q12 Pythagorean Theorem

> ■ **QUICK RECALL** `a² + b² = c² — c is ALWAYS the hypotenuse (longest side, opposite right angle)`

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

A. 7 ft	B. 10 ft
C. 14 ft	D. √28 ft

Answer: B. 10 ft

Q13 Area of a Circle · Radius vs. Diameter

> ■ **QUICK RECALL** `Area = πr² · Circumference = 2πr — always use RADIUS (half the diameter)!`

A circular pizza has a diameter of 14 inches. What is its area? (Use $\pi \approx 3.14$)

A. 615.44 in²	B. 153.86 in²
C. 43.96 in²	D. 307.72 in²

Answer: B. 153.86 in²

Q14 Complementary & Supplementary Angles

> ■ **QUICK RECALL** `COMPLEMENTARY = 90° · SUPPLEMENTARY = 180°`

Angles A and B are supplementary. Angle A = (3x + 15)°, Angle B = (x + 5)°. Find Angle B.

A. 40°	B. 45°
C. 55°	D. 135°

Answer: B. 45°

Q15 Volume of a Rectangular Prism

> ■ **QUICK RECALL** `Volume = l × w × h — multiply all 3 dimensions, then apply any percentage`

A fish tank is 40 cm long, 25 cm wide, and 30 cm tall.

If filled to 80% capacity, how many cm³ of water are inside?

A. 30,000 cm³	B. 24,000 cm³
C. 19,200 cm³	D. 3,000 cm³

Answer: B. 24,000 cm³

Q16 Similar Figures · Area Scale Factor

> ■ **QUICK RECALL** `AREA scales by the SQUARE of the side ratio: sides 3:5 → areas 9:25`

Two similar triangles have sides in ratio 3:5.

The smaller has area 27 cm². Find the area of the larger triangle.

A. 45 cm²	B. 75 cm²
C. 81 cm²	D. 135 cm²

Answer: B. 75 cm²

Q17 Parallel Lines & Transversals

> ■ **QUICK RECALL** `ALTERNATE interior angles = EQUAL · CO-INTERIOR (same-side) angles = 180°`

Two parallel lines are cut by a transversal.

Co-interior angles: (5x – 10)° and (3x + 30)°. Find x.

A. x = 10	B. x = 15
C. x = 20	D. x = 25

Answer: C. x = 20

Q18 Perimeter of Composite (L-Shape) Figures

■ **QUICK RECALL** L-shape perimeter = FULL rectangle perimeter! The cut removes 2 sides, adds 2 equal sides.

An L-shape is made by removing a 3 m × 4 m corner from a 10 m × 8 m rectangle.

What is the perimeter of the L-shape?

A. 36 m	B. 42 m
C. 46 m	D. 30 m

Answer: A. 36 m

Q19 Coordinate Geometry · Distance Formula

■ **QUICK RECALL** Distance = √[(x■–x■)² + (y■–y■)²] — Pythagorean Theorem on a grid

Find the distance between A(1, 2) and B(4, 6).

A. 3	B. 4
C. 5	D. 7

Answer: C. 5

Q20 Surface Area of a Cylinder

■ **QUICK RECALL** SA = 2πr² + 2πrh → 2 circles (top+bottom) + 1 rectangle (lateral face)

A cylindrical can has radius 4 cm and height 10 cm.

What is the total surface area? (π ≈ 3.14)

A. 100.48 cm²	B. 251.20 cm²
C. 351.68 cm²	D. 502.40 cm²

Answer: C. 351.68 cm²
