MATH MASTERY WORKSHEET

Pre-Algebra — Word Problems

10 questions · Key topics: Variables, Ratios, Percent, Integers, Fractions, Equations

---

Q01 · Variables & Equations

■ ISOLATE THE VARIABLE

Move numbers to one side, keep the variable alone. Do the same to both sides!

Example: x + 5 = 12 → x = 12 – 5 = 7

Sarah has some stickers. She gives away 8 stickers and has 15 left. Which equation finds the number she started with?

(A) x – 8 = 15, so x = 23

(B) x + 8 = 15, so x = 7

(C) 8x = 15, so x = 1.875

(D) x / 8 = 15, so x = 120

Q02 · Ratio & Proportion

■ CROSS-MULTIPLY

a/b = c/d → a×d = b×c. Set up equal fractions and cross-multiply to find x.

Example: 3/4 = x/12 → 36 = 4x → x = 9

A recipe uses 3 cups of flour for every 2 cups of sugar. How many cups of flour are needed for 8 cups of sugar?

(A) 10 cups

(B) 12 cups

(C) 16 cups

(D) 6 cups

Q03 · Percent

■ PERCENT = PART ÷ WHOLE × 100

"Of" means multiply. Sale price = original × (1 – discount rate).

Example: 30% of 50 = 0.30 × 50 = 15

A jacket originally costs $80. It is on sale for 25% off. What is the sale price?

(A) $55

(B) $20

(C) $60

(D) $65

Q04 · Integer Operations

■ SAME SIGN = ADD · DIFFERENT SIGN = SUBTRACT

Keep the sign of the number with larger absolute value. Use a number line!

The temperature was -4°F in the morning. It rose 11 degrees, then dropped 7 degrees. What is the final temperature?

(A) 4°F

(B) 0°F

(C) -14°F

(D) 14°F

Q05 · Order of Operations

■ PEMDAS — Parentheses / Exponents / Multiply-Divide / Add-Subtract

Always evaluate left to right within the same level. Multiplication BEFORE addition!

Example: 3 + 4 × 2 = 3 + 8 = 11 (NOT 14)

Tom earns $12/hr. He works 3 hours Monday and 5 hours Tuesday, then spends $20 on lunch. Which expression gives the correct amount left?

(A) 12 × 3 + 5 – 20 = 21

(B) 12 × (3 + 5) – 20 = 76

(C) (12 × 3) + 5 – 20 = 21

(D) 12 + 3 × 5 – 20 = 7

Q06 · Fractions

■ **COMMON DENOMINATOR TO ADD/SUBTRACT FRACTIONS**

Convert to same denominator first. 1/4 = 2/8. Then add or subtract numerators only.

Maria eats 3/8 of a pizza and her brother eats 1/4. What fraction is left?

(A) 3/8

(B) 5/8

(C) 4/8

(D) 1/2

Q07 · Inequalities

■ **FLIP THE SIGN WHEN DIVIDING/MULTIPLYING BY NEGATIVE!**

Solve like an equation, but if you × or ÷ both sides by a negative, reverse the inequality.

Jake needs at least $50. He has $18 and earns $8/hour. What is the minimum number of hours he must work?

(A) 3 hours

(B) 4 hours

(C) 5 hours

(D) 6 hours

Q08 · Rate & Speed

■ **D = R × T (Distance = Rate × Time)**

Opposite directions → ADD speeds. Same direction → SUBTRACT speeds.

Example: 60 mph for 2.5 hours → D = 60 × 2.5 = 150 miles

Train A travels at 60 mph and Train B at 40 mph from the same station in opposite directions. After how many hours are they 300 miles apart?

(A) 2 hours

(B) 3 hours

(C) 4 hours

(D) 5 hours

Q09 · Distributive Property

■ **a(b + c) = ab + ac — MULTIPLY OUTSIDE × EVERY TERM INSIDE**

Factor the common number outside parentheses. Multiply it with every item inside.

Notebooks cost $3 each and pens cost $1.50 each. A teacher buys 6 of each. Which expression uses the distributive property correctly?

(A) 6 × 3 + 1.50 = $19.50

(B) 6(3 + 1.50) = $27

(C) (6 + 3) × 1.50 = $13.50

(D) 6 × 3 × 1.50 = $27

Q10 · Two-Step Equations

■ **UNDO IN REVERSE PEMDAS ORDER: first ± then ×÷**

Step 1: add or subtract to move constants. Step 2: multiply or divide to isolate x.

Example: 2x + 6 = 14 → 2x = 8 → x = 4

Emma triples a number, then subtracts 7, and gets 20. What is her number?

(A) 4 (B) 7

(C) 9 (D) 13

ANSWER KEY — Pre-Algebra

Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10
A	B	C	B	B	A	B	B	B	C

MATH MASTERY WORKSHEET

Geometry — Word Problems

10 questions · Key topics: Perimeter, Area, Angles, Pythagorean Theorem, Volume, Similar Triangles

---

Q01 · Perimeter

■ **PERIMETER = SUM OF ALL SIDES**

Rectangle: P = 2(l + w). Don't forget to count BOTH lengths and BOTH widths!

Example: Rectangle 5×3: P = 2(5+3) = 16

A rectangular garden is 12 m long and 7 m wide. Fencing costs $5/meter. What is the total fencing cost?

(A) $95

(B) $190

(C) $420

(D) $380

Q02 · Area of Triangle

■ **A = 1/2 × base × height (height must be PERPENDICULAR!)**

The height is NOT the slant side — it must form a 90° angle with the base.

A triangular sail has a base of 9 m and a height of 14 m. What is the area?

(A) 63 m²

(B) 126 m²

(C) 46 m²

(D) 94.5 m²

Q03 · Circles — Circumference

■ **C = 2πr = πd (one full rotation = one circumference!)**

Given radius → C = 2πr. Given diameter → C = πd. Don't confuse the two!

Example: Radius = 5: C = 2π(5) = 10π ≈ 31.4

A wheel has a radius of 35 cm. How far does it travel in one complete rotation? (π ≈ 3.14)

(A) 109.9 cm

(B) 219.8 cm

(C) 3846.5 cm²

(D) 175 cm

Q04 · Angle Relationships

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

"S" for Straight line (180°). "C" for Corner/right angle (90°). Set up equation and solve!

Two supplementary angles are (3x + 10)° and (x + 30)°. What is the value of x?

(A) x = 25

(B) x = 35

(C) x = 40

(D) x = 50

Q05 · Pythagorean Theorem

■ **a² + b² = c² (c = hypotenuse, always the LONGEST side!)**

The hypotenuse is OPPOSITE the right angle. Common triples: 3-4-5, 5-12-13, 8-15-17.

Example: a=3, b=4: c² = 9+16 = 25 → c = 5

A 13 ft ladder leans against a wall with its base 5 ft from the wall. How high up does it reach?

(A) 8 ft

(B) 10 ft

(C) 12 ft

(D) 14 ft

Q06 · Area of Circle

■ **A = πr² — MUST USE RADIUS, NOT DIAMETER!**

If given diameter, divide by 2 FIRST to get radius, then square it. #1 most common trap!

A circular pizza has a diameter of 16 inches. What is the area? (π ≈ 3.14)

(A) 200.96 in²

(B) 803.84 in²

(C) 50.24 in²

(D) 401.92 in²

Q07 · Volume of Rectangular Prism

■ **V = l × w × h (units are CUBED: cm³, m³, ft³)**

Volume fills 3D space — multiply all three dimensions. Partial fill: multiply by fraction.

A fish tank is 60×30×40 cm and is filled 3/4 full. What is the volume of water?

(A) 54,000 cm³

(B) 72,000 cm³

(C) 36,000 cm³

(D) 48,000 cm³

Q08 · Triangle Angles

■ **ALL THREE ANGLES IN A TRIANGLE SUM TO 180°**

Set up: angle1 + angle2 + angle3 = 180°. Substitute expressions and solve for the variable.

A triangle has angles of 90°, (2x − 10)°, and (x + 20)°. Find x.

(A) x = 20

(B) x ≈ 26.7

(C) x = 30

(D) x = 35

Q09 · Composite Shapes

■ **SPLIT INTO SIMPLE SHAPES → CALCULATE EACH → ADD (or subtract for holes)**

L-shapes, T-shapes: divide into rectangles. Shaded region: subtract inner from outer.

An L-shaped room is made of two rectangles: 10×4 m and 6×3 m. What is the total area?

(A) 52 m²

(B) 58 m²

(C) 78 m²

(D) 46 m²

Q10 · Similar Triangles

■ **SIMILAR = SAME SHAPE, PROPORTIONAL SIDES → CROSS-MULTIPLY**

Set up: (side of small)/(side of big) = (other side of small)/(other side of big).

Example: Small sides 3,4,5 and big triangle base = 6 → scale factor 2 → sides 6, 8, 10

A 6 ft person casts a 4 ft shadow. A tree casts an 18 ft shadow at the same time. How tall is the tree?

(A) 12 ft

(B) 24 ft

(C) 27 ft

(D) 20 ft

ANSWER KEY — Geometry

Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10
B	A	B	B	C	A	A	B	B	C