

Pre-Algebra & Geometry

Practice Exam — 20 Questions (3 Steps Each)

Name: _____ Date: _____ Score: ____/20

Instructions: Each question has 3 steps. Circle your answer for each step. You must answer all 3 steps correctly to earn full credit for a question. Show your work in the space provided. Use $\pi \approx 3.14$ unless stated otherwise.

■ Pre-Algebra (Questions 1–10)

Question 1 | Order of Operations (PEMDAS)

Key Concept: PEMDAS: Parentheses → Exponents → Multiply/Divide → Add/Subtract

Step 1: Solve: $2 + 3 \times 4 - 1$

- | | |
|-------|-------|
| A) 19 | B) 13 |
| C) 22 | D) 11 |

Work space:

Step 2: Solve: $(5 + 3)^2 \div 4$

- | | |
|-------|-------|
| A) 12 | B) 16 |
| C) 8 | D) 32 |

Work space:

Step 3: Solve: $10 - 2 \times 3 + 4 \div 2$

- | | |
|-------|-------|
| A) 6 | B) 14 |
| C) 10 | D) 24 |

Work space:

Question 2 | Integers & Absolute Value

Key Concept: $|x|$ = distance from 0. Always non-negative. $|-7| = 7$, $|7| = 7$

Step 1: What is $|-12| - |4|$?

- | | |
|-------|--------|
| A) -8 | B) 8 |
| C) 16 | D) -16 |

Work space:

Step 2: Which is TRUE?

- | | |
|-----------------|-----------------|
| A) $ -9 < 4 $ | B) $ -9 = 9 $ |
| C) $ 0 = -1$ | D) $ 6 = -6$ |

Work space:

Step 3: Simplify: $-|-6| + |-2|$

- A) 8
B) -4
C) 4
D) -8

Work space:

Question 3 | Fractions, Decimals & Percents

Key Concept: Fraction→Decimal: divide top by bottom. Decimal→%: multiply by 100.

Step 1: What is $\frac{2}{5}$ as a percent?

- A) 25%
B) 40%
C) 50%
D) 20%

Work space:

Step 2: What is 0.35 as a simplified fraction?

- A) $\frac{35}{10}$
B) $\frac{7}{20}$
C) $\frac{7}{10}$
D) $\frac{3}{5}$

Work space:

Step 3: Order: 0.6, $\frac{3}{5}$, 62% from least to greatest

- A) 0.6, $\frac{3}{5}$, 62%
B) $\frac{3}{5}$, 0.6, 62%
C) All equal
D) 62%, 0.6, $\frac{3}{5}$

Work space:

Question 4 | Ratios & Proportions

Key Concept: Proportion: $\frac{a}{b} = \frac{c}{d}$. Cross multiply: $axd = bxc$ to solve.

Step 1: Solve for x: $\frac{5}{8} = \frac{x}{40}$

- A) 20
B) 25
C) 32
D) 15

Work space:

Step 2: 2 cups sugar for 3 cups flour. Sugar needed for 9 cups flour?

- A) 4 cups
B) 6 cups
C) 3 cups
D) 5 cups

Work space:

Step 3: 4 pens cost \$6.00. How much do 10 pens cost?

- A) \$12.00
- C) \$18.00

- B) \$15.00
- D) \$14.00

Work space:

Question 5 | Solving One-Step Equations

Key Concept: Use inverse operations. Keep both sides equal. $+ \leftrightarrow -$, $\times \leftrightarrow \div$

Step 1: Solve: $x - 9 = 13$

- A) $x = 4$
- C) $x = 13$

- B) $x = 22$
- D) $x = -4$

Work space:

Step 2: Solve: $7x = 56$

- A) $x = 63$
- C) $x = 8$

- B) $x = 49$
- D) $x = 7$

Work space:

Step 3: Solve: $x/4 = 9$

- A) $x = 36$
- C) $x = 2.25$

- B) $x = 13$
- D) $x = 4$

Work space:

Question 6 | Inequalities

Key Concept: Solve like equations BUT flip the sign when multiplying/dividing by a negative!

Step 1: Solve: $x + 4 < 10$

- A) $x < 14$
- C) $x > 6$

- B) $x < 6$
- D) $x > 14$

Work space:

Step 2: Solve: $-3x \geq 12$

- A) $x \geq -4$
- C) $x \geq 4$

- B) $x \leq -4$
- D) $x \leq 4$

Work space:

Step 3: Which value satisfies $2x - 1 \leq 9$?

- A) $x = 6$
- C) $x = 5$

- B) $x = 7$
- D) $x = 8$

Work space:

Question 7 | Exponents & Scientific Notation

Key Concept: $x^a \times x^b = x^{(a+b)}$. Scientific notation: $a \times 10^n$ where $1 \leq a < 10$.

Step 1: Simplify: $x^3 \times x^1$

A) x^1

B) x^4

C) x^2

D) $2x^3$

Work space:

Step 2: Write 0.00032 in scientific notation

A) 3.2×10^4

B) 3.2×10^{-4}

C) 32×10^{-4}

D) 0.32×10^{-3}

Work space:

Step 3: What is $(2^3)^2$?

A) 12

B) 32

C) 64

D) 16

Work space:

Question 8 | Coordinate Plane

Key Concept: Points (x, y). Q1:(+,+) Q2:(-,+) Q3:(-,-) Q4:(+,-). Distance = $\sqrt{(x^2+y^2)}$

Step 1: Which quadrant is $(-5, -2)$ in?

A) Quadrant I

B) Quadrant II

C) Quadrant III

D) Quadrant IV

Work space:

Step 2: Distance from $(0,0)$ to $(3,4)$?

A) 5

B) 7

C) 25

D) 12

Work space:

Step 3: Which point is on the y-axis?

A) $(3, 0)$

B) $(0, -5)$

C) $(2, 2)$

D) $(-3, 1)$

Work space:

Question 9 | Slope & Linear Equations

Key Concept: Slope $m = (y_2 - y_1) / (x_2 - x_1)$. Slope-intercept: $y = mx + b$.

Step 1: Slope between (2, 3) and (6, 11)?

- A) 3
C) 4
- B) 2
D) 1/2

Work space:

Step 2: y-intercept of $y = 3x - 7$?

- A) 3
C) 7
- B) -7
D) -3

Work space:

Step 3: Equation with slope -2 and y-intercept 5?

- A) $y = 5x - 2$
C) $y = 2x + 5$
- B) $y = -2x + 5$
D) $y = -5x + 2$

Work space:

Question 10 | Probability

Key Concept: $P(\text{event}) = \text{favorable outcomes} / \text{total outcomes}$. Always between 0 and 1.

Step 1: Roll a die. $P(\text{even number}) = ?$

- A) 1/6
C) 1/3
- B) 1/2
D) 2/3

Work space:

Step 2: Cards 1–10. $P(\text{multiple of 3}) = ?$

- A) 1/5
C) 1/3
- B) 3/10
D) 2/5

Work space:

Step 3: $P(\text{rain}) = 0.35$. $P(\text{no rain}) = ?$

- A) 0.35
C) 0.75
- B) 0.65
D) 1.35

Work space:

■ Geometry (Questions 11–20)

Question 11 | Angles & Angle Relationships

- A) 10
- C) 15

- B) 13
- D) 17

Work space:

Step 2: Hypotenuse 10, one leg 6. Find other leg.

- A) 6
- C) 4

- B) 8
- D) 16

Work space:

Step 3: Is a triangle with sides 7, 24, 25 a right triangle?

- A) Yes
- C) Only if scaled

- B) No
- D) Cannot tell

Work space:

Question 14 | Area of 2D Shapes

Key Concept: Rectangle: lw | Triangle: $\frac{1}{2}Bh$ | Circle: πr^2 | Trapezoid: $\frac{1}{2}(b_1+b_2)h$

Step 1: Area of circle, $r = 7$ cm. ($\pi \approx 3.14$)

- A) 43.96 cm²
- C) 21.98 cm²

- B) 153.86 cm²
- D) 49 cm²

Work space:

Step 2: Trapezoid: bases 6 m and 10 m, height 4 m. Area?

- A) 24 m²
- C) 64 m²

- B) 32 m²
- D) 40 m²

Work space:

Step 3: Rectangle: perimeter 26 cm, width 5 cm. Area?

- A) 40 cm²
- C) 80 cm²

- B) 130 cm²
- D) 25 cm²

Work space:

Question 15 | Volume of 3D Shapes

Key Concept: Prism: lwh | Cylinder: πr^2h | Cone: $\frac{1}{3}\pi r^2h$ | Sphere: $\frac{4}{3}\pi r^3$

Step 1: Volume of rectangular prism: $5 \times 4 \times 3$ cm.

- A) 47 cm³
- C) 30 cm³

- B) 60 cm³
- D) 12 cm³

- A) 6
- C) 3

- B) 8
- D) 12

Work space:

Step 3: Which guarantees triangles are CONGRUENT?

- A) AA
- C) Same angles only

- B) SSS
- D) One equal side

Work space:

Question 18 | Circles: Circumference & Arc

Key Concept: $C = 2\pi r = \pi d$. Arc length = $(\text{angle}/360^\circ) \times 2\pi r$.

Step 1: Circumference of circle, diameter 14 cm. ($\pi \approx 3.14$)

- A) 21.98 cm
- C) 153.86 cm

- B) 43.96 cm
- D) 87.92 cm

Work space:

Step 2: Circle $r=6$. Arc length for 90° angle. ($\pi \approx 3.14$)

- A) 9.42
- C) 6.28

- B) 18.84
- D) 12.57

Work space:

Step 3: Circumference = 62.8 cm. What is the radius? ($\pi \approx 3.14$)

- A) 5 cm
- C) 20 cm

- B) 10 cm
- D) 62.8 cm

Work space:

Question 19 | Surface Area

Key Concept: Prism: $2(lw+lh+wh)$. Cube: $6s^2$. Cylinder: $2\pi r^2+2\pi rh$. Sphere: $4\pi r^2$.

Step 1: Surface area of cube, side = 5 cm.

- A) 25 cm²
- C) 150 cm²

- B) 125 cm²
- D) 30 cm²

Work space:

Step 2: Cylinder: $r=3$, $h=7$. SA? ($\pi \approx 3.14$)

- A) 188.4
- C) 131.88

- B) 197.82
- D) 56.52

Work space:

Step 3: Sphere $r=4$. SA? ($\pi \approx 3.14$)

- A) 50.24
- C) 200.96

- B) 201.06
- D) 100.48

Work space:

Question 20 | Transformations

Key Concept: Translation: slide. Reflection: flip. Rotation: turn. Dilation: resize. Reflect over x-axis: $(x,y) \rightarrow (x,-y)$.

Step 1: Translate $(2, 3)$ by $(-4, 5)$. Image?

- A) $(6, 8)$
- C) $(2, 8)$

- B) $(-2, 8)$
- D) $(-2, -2)$

Work space:

Step 2: Reflect $(-3, 7)$ over the y-axis. Image?

- A) $(3, 7)$
- C) $(3, -7)$

- B) $(-3, -7)$
- D) $(-3, 7)$

Work space:

Step 3: Dilate $(4, 6)$ with scale factor $1/2$. Image?

- A) $(8, 12)$
- C) $(4, 3)$

- B) $(2, 3)$
- D) $(2, 6)$

Work space:

Answer Key

Q#	Topic	Step 1	Step 2	Step 3
1	Order of Operations (PEMDAS)	B	B	A
2	Integers & Absolute Value	B	B	B
3	Fractions, Decimals & Percents	B	B	B
4	Ratios & Proportions	B	B	B
5	Solving One-Step Equations	B	C	A
6	Inequalities	B	B	C
7	Exponents & Scientific Notation	B	B	C
8	Coordinate Plane	C	A	B
9	Slope & Linear Equations	B	B	B
10	Probability	B	B	B
11	Angles & Angle Relationships	B	A	B
12	Triangles	B	B	D
13	Pythagorean Theorem	B	B	A
14	Area of 2D Shapes	B	B	A
15	Volume of 3D Shapes	B	A	B
16	Parallel Lines & Transversals	B	B	B
17	Similar & Congruent Figures	B	A	B
18	Circles: Circumference & Arc	B	A	B
19	Surface Area	C	A	C
20	Transformations	B	A	B