Pre-Algebra & Geometry Practice Worksheet

Self-Study Edition · 20 Core Problems · Answer Key Included

◆ PRE-ALGEBRA

Topic: Order of Operations

■ *MEMORY KEY: PEMDAS — Parentheses → Exponents → Multiply/Divide → Add/Subtract (left to right)*

Quick Example: 2 + 3 x 4 = 2 + 12 = 14 (NOT 20 — multiply first!)

Q1. Evaluate: 3 + 4 x (2^2 - 1) / 3

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

Topic: Negative Integers

■ *MEMORY KEY: Subtracting a negative = ADDING: a - (-b) = a + b*

Quick Example: 5 - (-3) = 5 + 3 = 8 (two negatives become positive)

Q2. What is: -8 - (-13) + (-5)?

A) -26
B) 0
C) -10
D) 10

Topic: Fractions — Add / Subtract

■ *MEMORY KEY: Find LCD first — then add numerators only. NEVER add denominators!*

Quick Example: 1/4 + 1/6 = 3/12 + 2/12 = 5/12

Q3. Simplify: 3/4 - 2/3 + 1/6

A) 1/4
B) 1/6
C) 2/12
D) 5/12

Topic: Solving One-Step Equations

■ *MEMORY KEY: INVERSE OPERATION — undo what is done to x on BOTH sides equally.*

Quick Example: x + 5 = 12 => x = 7

Q4. Solve for x: -3x + 7 = -5

A) x = -4
B) x = 2/3
C) x = 4
D) x = -2/3

Topic: Ratios & Proportions

■ *MEMORY KEY: CROSS-MULTIPLY: a/b = c/d => ad = bc*

Quick Example: 3/4 = x/8 => 3x8 = 4x => x = 6

Q5. A recipe uses 2 cups of flour for every 3 cookies.
How many cups of flour are needed to make 45 cookies?

A) 25 cups
B) 30 cups
C) 90 cups
D) 15 cups

Topic: Percent Problems

■ *MEMORY KEY: IS/OF rule — percent = (IS / OF) x 100 or part = rate x whole*

Quick Example: 30% of 80 = 0.30 x 80 = 24

Q6. A shirt costs $40. After a 15% discount, what is the sale price?

A) $6
B) $34
C) $55
D) $46

Topic: Exponents & Powers

■ *MEMORY KEY: Negative exponent = FLIP it: a^(-n) = 1/a^n. Zero exponent: anything^0 = 1*

Quick Example: 2^(-3) = 1/8 ; 5^0 = 1

Q7. Simplify: 2^3 x 2^(-1) + 3^0

A) 5
B) 3
C) 9
D) 4

Topic: Distributive Property

■ *MEMORY KEY: DISTRIBUTE means multiply outside value to EVERY term inside: a(b+c) = ab + ac*

Quick Example: -2(x - 4) = -2x + 8 (negative x negative = positive!)

Q8. Simplify: -2(3x - 4) + 5x

A) -x - 8
B) 11x + 8
C) -x + 8
D) -11x - 8

Topic: Inequalities

■ *MEMORY KEY: FLIP the inequality sign when multiplying or dividing by a NEGATIVE number!*

Quick Example: -2x > 6 => x < -3 (sign flips!)

Q9. Solve: -4x + 3 <= 11

A) x <= -2
B) x >= 2
C) x >= -2
D) x <= 2

Topic: Word Problem — Two-Step

■ *MEMORY KEY: READ -> DEFINE variable -> WRITE equation -> SOLVE -> CHECK back in the problem.*

Quick Example: '3 more than twice a number is 13' => 2n + 3 = 13 => n = 5

Q10. Tom saves $12 each week. He already has $35 saved.
After how many full weeks will he have at least $95?

A) 4 weeks
B) 6 weeks
C) 5 weeks
D) 7 weeks

◆ GEOMETRY

Topic: Supplementary & Complementary Angles

■ *MEMORY KEY: C = Complementary = Corner (90°). S = Supplementary = Straight line (180°).*

Quick Example: Supplement of 35 deg = 180 - 35 = 145 deg

Q11. Two angles are supplementary. One is three times the other.
Find the smaller angle.

A) 45 deg
B) 135 deg
C) 60 deg
D) 30 deg

Topic: Triangle Angle Sum

■ *MEMORY KEY: ALL triangle interior angles always add up to EXACTLY 180 degrees.*

Quick Example: Angles 50 + 70 + ? = 180 => missing = 60 deg

Q12. A triangle has angles in ratio 1 : 2 : 3. What is the largest angle?

A) 60 deg
B) 30 deg
C) 90 deg
D) 120 deg

Topic: Pythagorean Theorem

■ *MEMORY KEY: a^2 + b^2 = c^2 where c is ALWAYS the HYPOTENUSE (opposite right angle).*

Quick Example: Legs 3, 4 => hypotenuse = sqrt(9+16) = 5 (3-4-5 triple!)

Q13. A ladder 13 m long leans against a wall. Its base is 5 m from the wall.
How high does it reach?

A) 8 m
B) 10 m
C) 12 m
D) sqrt(194) m

Topic: Area of Composite Shapes

■ *MEMORY KEY: SPLIT complex shape into simple ones. ADD or SUBTRACT their areas.*

Quick Example: L-shape = big rectangle minus small rectangle cut from corner

Q14. A rectangle is 10 cm x 6 cm. A 2 cm x 2 cm square is cut from one corner.
What is the remaining area?

A) 60 cm^2
B) 56 cm^2
C) 52 cm^2
D) 64 cm^2

Topic: Circumference & Area of Circle

■ *MEMORY KEY: C = pi x d and A = pi x r^2. Remember: radius = diameter / 2 !!*

Quick Example: Circle r=5: C = 10pi ; A = 25pi

Q15. A circle has a diameter of 10 cm. What is its area? (Use pi = 3.14)

A) 31.4 cm^2
B) 314 cm^2
C) 78.5 cm^2
D) 62.8 cm^2

Topic: Parallel Lines & Transversals

■ *MEMORY KEY: Alternate angles = EQUAL. Co-interior angles = ADD UP TO 180 deg.*

Quick Example: Co-interior angle 110 deg => pair = 180 - 110 = 70 deg

Q16. Two parallel lines are cut by a transversal. One co-interior angle is 112 deg. What is the other co-interior angle?

A) 112 deg
B) 68 deg
C) 58 deg
D) 78 deg

Topic: Volume of Rectangular Prism

■ *MEMORY KEY: V = l x w x h. 1 liter = 1,000 cm^3. Don't confuse V with Surface Area!*

Quick Example: Box 3x4x5 => V = 60 units^3

Q17. A fish tank is 50 cm long, 30 cm wide, and 40 cm deep. How many liters of water does it hold? (1 liter = 1,000 cm^3)

A) 6 liters
B) 60 liters
C) 600 liters
D) 6,000 liters

Topic: Similar Triangles

■ *MEMORY KEY: Area scales by the SQUARE of the side ratio. Side ratio 3:5 => Area ratio 9:25*

Quick Example: Side ratio 1:2 => Area ratio 1:4 (areas are 4x bigger, not 2x!)

Q18. Two similar triangles have sides in ratio 3 : 5. The smaller has area 27 cm^2. What is the larger triangle's area?

A) 45 cm^2
B) 75 cm^2
C) 135 cm^2
D) 50 cm^2

Topic: Exterior Angle Theorem

■ *MEMORY KEY: EXTERIOR angle = SUM of the two NON-ADJACENT interior angles.*

Quick Example: Interior 40 + 65 => exterior angle opposite = 105 deg

Q19. In a triangle, two interior angles are 48 deg and 73 deg.
What is the exterior angle at the third vertex?

A) 59 deg
B) 121 deg
C) 180 deg
D) 107 deg

Topic: Surface Area of Cylinder

■ *MEMORY KEY: SA = 2 circles + rectangle: SA = 2*pi*r^2 + 2*pi*r*h = 2*pi*r*(r + h)*

Quick Example: Cylinder r=3, h=5: SA = 18pi + 30pi = 48pi

Q20. A cylinder has radius 4 cm and height 7 cm.
What is the total surface area? (answer in terms of pi)

A) 44pi cm^2
B) 56pi cm^2
C) 88pi cm^2
D) 112pi cm^2

ANSWER KEY

Q1: **B**	Q2: **B**	Q3: **A**	Q4: **C**	Q5: **B**
Q6: **B**	Q7: **A**	Q8: **C**	Q9: **C**	Q10: **C**
Q11: **A**	Q12: **C**	Q13: **C**	Q14: **B**	Q15: **C**
Q16: **B**	Q17: **B**	Q18: **B**	Q19: **B**	Q20: **C**