

# Math Practice Worksheet

Algebra 1 & Geometry | 20 Problems

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Class: \_\_\_\_\_ Score: \_\_\_\_\_ / 20

**Instructions:** For each problem, read the concept and worked example, then answer all 3 steps. Circle your answer for each step. All 3 steps must be correct to earn full credit (5 points per problem).

## ===== ALGEBRA 1 =====

### Problem 1: Solving Linear Equations

#### [ CONCEPT ]

To solve a linear equation, use inverse operations to isolate the variable.

Key Rule: Whatever you do to one side, you must do to the other side.

Formula:  $ax + b = c \Rightarrow x = (c - b) / a$

#### [ WORKED EXAMPLE ]

Solve  $3x + 7 = 22$

Step 1: Subtract 7 from both sides:  $3x = 15$

Step 2: Divide both sides by 3:  $x = 5$

#### YOUR TURN:

**Solve the equation:  $2x - 5 = 11$**

Step 1: What operation do you perform first to isolate the variable term?

- A) Add 5 to both sides B) Subtract 5 from both sides  
C) Multiply both sides by 2 D) Divide both sides by 2

Work space:

Step 2: After performing Step 1, you should get  $2x = 16$ . What is the next step?

- A) Add 16 to both sides B) Subtract 16 from both sides  
C) Divide both sides by 2 D) Multiply both sides by 2

Work space:

Step 3: What is the final solution?

A)  $x = 3$  B)  $x = 6$  C)  $x = 8$  D)  $x = 16$

Work space:

Answer Key: Step 1: A) Add 5 to both sides | Step 2: C) Divide both sides by 2 | Step 3: C)  $x = 8$

## Problem 2: Inequalities

---

### [ CONCEPT ]

Solving inequalities is like solving equations, EXCEPT:

When multiplying or dividing by a NEGATIVE number, FLIP the inequality sign!

Example:  $-2x > 6 \Rightarrow x < -3$  (sign flipped!)

### [ WORKED EXAMPLE ]

Solve  $-3x + 2 \leq 14$

Step 1: Subtract 2:  $-3x \leq 12$

Step 2: Divide by -3 (FLIP the sign!):  $x \geq -4$

### YOUR TURN:

**Solve the inequality:  $-4x + 8 > 20$**

Step 1: Subtract 8 from both sides. What is the result?

A)  $-4x > 28$  B)  $-4x > 12$  C)  $-4x < 12$  D)  $4x > 12$

Work space:

Step 2: When dividing by -4, what happens to the inequality sign?

A) Stays  $>$  B) Becomes  $<$  C) Becomes  $=$  D) Becomes  $\leq$

Work space:

Step 3: What is the final solution?

A)  $x > -3$  B)  $x < 3$  C)  $x < -3$  D)  $x > 3$

Work space:

Answer Key: Step 1: B)  $-4x > 12$  | Step 2: B) Becomes  $<$  | Step 3: C)  $x < -3$

### Problem 3: Slope & Linear Functions

---

**[ CONCEPT ]**

Slope = rise/run =  $(y_2 - y_1) / (x_2 - x_1)$

Slope-intercept form:  $y = mx + b$

where  $m$  = slope,  $b$  = y-intercept

**[ WORKED EXAMPLE ]**

Find slope through (2, 3) and (6, 11):

$$m = (11-3)/(6-2) = 8/4 = 2$$

**YOUR TURN:**

**A line passes through (1, 4) and (5, 12). Find the equation in  $y = mx + b$  form.**

Step 1: Calculate the slope using the two points.

A)  $m = 1/2$  B)  $m = 3$  C)  $m = 2$  D)  $m = 4$

Work space:

Step 2: Using  $y = mx + b$  with slope = 2 and point (1, 4), solve for b.

A)  $b = 6$  B)  $b = 2$  C)  $b = 4$  D)  $b = 8$

Work space:

Step 3: What is the equation of the line?

A)  $y = 2x + 4$  B)  $y = 4x + 2$  C)  $y = 2x + 2$  D)  $y = 2x - 2$

Work space:

Answer Key: Step 1: C)  $m = 2$  | Step 2: B)  $b = 2$  | Step 3: C)  $y = 2x + 2$

### Problem 4: Systems of Equations

---

**[ CONCEPT ]**

A system of equations has two equations with two unknowns.

Substitution Method: Solve one equation for one variable, substitute into the other.

Elimination Method: Add or subtract equations to eliminate one variable.

**[ WORKED EXAMPLE ]**

Solve:  $y = 2x + 1$  and  $x + y = 7$

Substitute:  $x + (2x+1) = 7 \Rightarrow 3x = 6 \Rightarrow x = 2, y = 5$

**YOUR TURN:**

**Solve the system:  $y = 3x - 1$  and  $2x + y = 9$**

Step 1: Substitute  $y = 3x - 1$  into  $2x + y = 9$ .

A)  $5x - 1 = 9$  B)  $2x + 3x - 1 = 9$  C)  $5x = 9$  D)  $2x - 1 = 9$

Work space:

Step 2: Solve  $5x - 1 = 9$  for  $x$ .

A)  $x = 1$  B)  $x = 3$  C)  $x = 2$  D)  $x = 4$

Work space:

Step 3: What is the solution  $(x, y)$ ?

A)  $(2, 4)$  B)  $(2, 5)$  C)  $(3, 6)$  D)  $(1, 2)$

Work space:

Answer Key: Step 1: B)  $2x + 3x - 1 = 9$  | Step 2: C)  $x = 2$  | Step 3: B)  $(2, 5)$

## Problem 5: Exponent Rules

---

### [ CONCEPT ]

Product rule:  $x^a * x^b = x^{(a+b)}$

Power rule:  $(x^a)^b = x^{(ab)}$

Quotient rule:  $x^a / x^b = x^{(a-b)}$

Also:  $x^0 = 1$  and  $x^{(-n)} = 1/x^n$

### [ WORKED EXAMPLE ]

Simplify  $(x^3)^2 * x^4 = x^6 * x^4 = x^{(6+4)} = x^{10}$

### YOUR TURN:

#### Simplify the expression: $(2x^3)^2 * x^{(-1)}$

Step 1: Simplify  $(2x^3)^2$  using the power rule.

A)  $2x^6$  B)  $4x^5$  C)  $4x^6$  D)  $2x^5$

Work space:

Step 2: Multiply  $4x^6 * x^{(-1)}$  using the product rule.

A)  $4x^7$  B)  $4x^5$  C)  $4x^{(-6)}$  D)  $4x^6$

Work space:

Step 3: What is the final simplified form?

A)  $2x^5$  B)  $4x^7$  C)  $4x^5$  D)  $4x^6$

Work space:

Answer Key: Step 1: C)  $4x^6$  | Step 2: B)  $4x^5$  | Step 3: C)  $4x^5$

## Problem 6: Factoring Trinomials

---

### [ CONCEPT ]

To factor  $x^2 + bx + c$ , find two numbers p and q such that:

$$p * q = c \text{ AND } p + q = b$$

Then write as  $(x + p)(x + q)$

### [ WORKED EXAMPLE ]

Factor  $x^2 + 5x + 6$ : Find numbers that multiply to 6 and add to 5.

2 and 3 work! Answer:  $(x + 2)(x + 3)$

### YOUR TURN:

**Factor the trinomial:  $x^2 - 7x + 12$**

Step 1: Find two numbers that multiply to 12 and add to -7.

- A) 3 and 4 B) -3 and -4 C) -2 and -6 D) 2 and 6

Work space:

Step 2: Write the factored form using -3 and -4.

- A)  $(x+3)(x+4)$  B)  $(x-3)(x+4)$  C)  $(x-3)(x-4)$  D)  $(x-12)(x+1)$

Work space:

Step 3: What are the zeros (roots) of  $x^2 - 7x + 12 = 0$ ?

- A)  $x=3$  and  $x=4$  B)  $x=-3$  and  $x=-4$  C)  $x=-3$  and  $x=4$  D)  $x=3$  and  $x=-4$

Work space:

Answer Key: Step 1: B) -3 and -4 | Step 2: C)  $(x-3)(x-4)$  | Step 3: A)  $x=3$  and  $x=4$

## Problem 7: Quadratic Formula

---

### [ CONCEPT ]

For  $ax^2 + bx + c = 0$ :

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant =  $b^2 - 4ac$ :

$>0$ : two solutions |  $=0$ : one |  $<0$ : no real solutions

### [ WORKED EXAMPLE ]

Solve  $x^2 - 5x + 4 = 0$  ( $a=1$ ,  $b=-5$ ,  $c=4$ )

$$x = \frac{5 \pm \sqrt{25-16}}{2} = \frac{5 \pm 3}{2} \Rightarrow x=4 \text{ or } x=1$$

### YOUR TURN:

**Solve using the quadratic formula:  $2x^2 + 3x - 5 = 0$**

Step 1: Calculate the discriminant  $b^2 - 4ac$  ( $a=2$ ,  $b=3$ ,  $c=-5$ ).

A) 49 B) 31 C) 9 D) -31

Work space:

Step 2: In  $x = \frac{-3 \pm \sqrt{49}}{4}$ , what is  $\sqrt{49}$ ?

A) 6 B) 8 C) 7 D) 9

Work space:

Step 3: Calculate both solutions.

A)  $x=1$  and  $x=-2.5$  B)  $x=2$  and  $x=-3$  C)  $x=1$  and  $x=2$  D)  $x=-1$  and  $x=2.5$

Work space:

Answer Key: Step 1: A) 49 | Step 2: C) 7 | Step 3: A)  $x=1$  and  $x=-2.5$

## Problem 8: Word Problems - Rates

---

### [ CONCEPT ]

Distance = Rate x Time ( $D = RT$ )

For objects moving in opposite directions: distances ADD up.

Always define your variable before writing the equation!

### [ WORKED EXAMPLE ]

Car travels 240 miles at 60 mph:  $T = D/R = 240/60 = 4$  hours

### YOUR TURN:

**Two cars start at the same point going in opposite directions. Car A: 55 mph, Car B: 45 mph. When are they 300 miles apart?**

Step 1: If time =  $t$  hours, what is the total combined distance?

A)  $55t + 45t$  B)  $55t \times 45t$  C)  $55 + 45 = 100$  D)  $(55+45)^2 \cdot t$

Work space:

Step 2: Set the total distance equal to 300 miles.

A)  $55t = 300$  B)  $100t = 300$  C)  $45t = 300$  D)  $10t = 300$

Work space:

Step 3: Solve for  $t$  (time in hours).

A)  $t = 2.5$  hours B)  $t = 3$  hours C)  $t = 4$  hours D)  $t = 5$  hours

Work space:

Answer Key: Step 1: A)  $55t + 45t$  | Step 2: B)  $100t = 300$  | Step 3: B)  $t = 3$  hours

## Problem 9: Functions & Domain/Range

---

### [ CONCEPT ]

A function assigns exactly one output for each input.

Domain = all valid input (x) values

Range = all possible output values

Polynomials: Domain = all real numbers

### [ WORKED EXAMPLE ]

$f(x) = 2x^2 - 3$ . Find  $f(-2)$ :

$$f(-2) = 2(-2)^2 - 3 = 2(4) - 3 = 5$$

### YOUR TURN:

**Given  $f(x) = x^2 - 4x + 3$ , answer the following questions.**

Step 1: Find  $f(-1)$ .

A)  $f(-1) = 8$  B)  $f(-1) = 6$  C)  $f(-1) = 2$  D)  $f(-1) = 0$

Work space:

Step 2: For what values of  $x$  does  $f(x) = 0$ ?

A)  $x=1$  and  $x=3$  B)  $x=-1$  and  $x=3$  C)  $x=1$  and  $x=-3$  D)  $x=4$  and  $x=-1$

Work space:

Step 3: What is the domain of  $f(x) = x^2 - 4x + 3$ ?

A)  $x \geq 0$  B)  $x \neq 0$  C) All real numbers D)  $x > 0$

Work space:

Answer Key: Step 1: A)  $f(-1) = 8$  | Step 2: A)  $x=1$  and  $x=3$  | Step 3: C) All real numbers

## Problem 10: Absolute Value Equations

---

### [ CONCEPT ]

$|\text{expression}| = c$  means:

$\text{expression} = c$  OR  $\text{expression} = -c$

If  $c < 0$ , there is NO solution!

(Absolute value is NEVER negative)

### [ WORKED EXAMPLE ]

Solve  $|2x - 3| = 7$ :

Case 1:  $2x - 3 = 7 \Rightarrow x = 5$

Case 2:  $2x - 3 = -7 \Rightarrow x = -2$

**YOUR TURN:**

**Solve the equation:  $|3x + 6| = 15$**

Step 1: What are the two cases to set up?

A)  $3x+6=15$  only B)  $3x+6=15$  OR  $3x+6=-15$  C)  $3x+6=+/-15^2$  D)  $3x=15$  OR  $3x=-15$

Work space:

Step 2: Solve Case 1:  $3x + 6 = 15$ .

A)  $x = 5$  B)  $x = 3$  C)  $x = 7$  D)  $x = 9$

Work space:

Step 3: What are BOTH solutions?

A)  $x=3$  only B)  $x=3$  and  $x=7$  C)  $x=3$  and  $x=-7$  D)  $x=-3$  and  $x=7$

Work space:

Answer Key: Step 1: B)  $3x+6=15$  OR  $3x+6=-15$  | Step 2: B)  $x = 3$  | Step 3: C)  $x=3$  and  $x=-7$

---

# ===== GEOMETRY =====

---

## Problem 11: Angle Relationships

---

### [ CONCEPT ]

Complementary angles: sum = 90 degrees

Supplementary angles: sum = 180 degrees

Vertical angles: equal (opposite angles at an intersection)

### [ WORKED EXAMPLE ]

Two supplementary angles. One is 65 degrees.

$$x + 65 = 180 \Rightarrow x = 115 \text{ degrees}$$

### YOUR TURN:

**Two angles are complementary. One angle is 3 times the other. Find both angles.**

Step 1: Let the smaller angle =  $x$ . Write the equation for complementary angles.

A)  $x + 3x = 180$  B)  $3x = 90$  C)  $x + 3x = 90$  D)  $2x + x = 90$

Work space:

Step 2: Solve  $4x = 90$ .

A)  $x = 20 \text{ deg}$  B)  $x = 22.5 \text{ deg}$  C)  $x = 25 \text{ deg}$  D)  $x = 30 \text{ deg}$

Work space:

Step 3: What are the two angles?

A) 30 and 60 B) 22.5 and 67.5 C) 20 and 60 D) 25 and 75

Work space:

Answer Key: Step 1: C)  $x + 3x = 90$  | Step 2: B)  $x = 22.5 \text{ deg}$  | Step 3: B) 22.5 and 67.5

## Problem 12: Triangle Properties

---

### [ CONCEPT ]

Triangle Angle Sum Theorem: sum of interior angles = 180 degrees

Exterior Angle Theorem:

exterior angle = sum of the two non-adjacent interior angles

### [ WORKED EXAMPLE ]

A triangle has angles 50 deg and 70 deg. Third angle:

$$x = 180 - 50 - 70 = 60 \text{ degrees}$$

**YOUR TURN:**

**In a triangle, the angles are in the ratio 2 : 3 : 5. Find all angles and identify the triangle type.**

Step 1: Let angles =  $2x$ ,  $3x$ ,  $5x$ . Write the equation.

- A)  $2x + 3x = 180$  B)  $2x \cdot 3x \cdot 5x = 180$  C)  $2x + 3x + 5x = 180$  D)  $10x = 90$

Work space:

Step 2: Solve  $10x = 180$ .

- A)  $x = 10$  B)  $x = 15$  C)  $x = 18$  D)  $x = 20$

Work space:

Step 3: The angles are 36, 54, 90 degrees. What type of triangle?

- A) Equilateral B) Obtuse C) Right triangle D) Equiangular

Work space:

Answer Key: Step 1: C)  $2x + 3x + 5x = 180$  | Step 2: C)  $x = 18$  | Step 3: C) Right triangle

## Problem 13: Pythagorean Theorem

---

### [ CONCEPT ]

For a RIGHT triangle with legs a, b and hypotenuse c:

$$a^2 + b^2 = c^2$$

Common triples: 3-4-5, 5-12-13, 8-15-17, 7-24-25

### [ WORKED EXAMPLE ]

Legs = 6 and 8. Find hypotenuse:

$$c^2 = 6^2 + 8^2 = 36 + 64 = 100 \Rightarrow c = 10$$

### YOUR TURN:

**A 13-foot ladder leans against a wall. The base is 5 feet from the wall. How high up the wall does it reach?**

Step 1: In this right triangle, which side is the hypotenuse?

A) Wall height B) Distance from wall (5 ft) C) The ladder (13 ft) D) The floor

Work space:

Step 2: Let h = height. Which equation is correct?

A)  $h^2 + 13^2 = 5^2$  B)  $5^2 + h^2 = 13^2$  C)  $5 + h = 13$  D)  $h^2 = 13 - 5$

Work space:

Step 3: Solve for h.

A) h = 8 ft B) h = 10 ft C) h = 12 ft D) h = 14 ft

Work space:

Answer Key: Step 1: C) The ladder (13 ft) | Step 2: B)  $5^2 + h^2 = 13^2$  | Step 3: C) h = 12 ft

## Problem 14: Area & Perimeter

---

### [ CONCEPT ]

Rectangle:  $A = l \cdot w$ ,  $P = 2(l+w)$

Triangle:  $A = (1/2) \cdot b \cdot h$

Circle:  $A = \pi \cdot r^2$ ,  $C = 2 \cdot \pi \cdot r$

### [ WORKED EXAMPLE ]

Circle with radius 5:  $A = \pi(5^2) = 25\pi$  approx 78.54 sq units

### YOUR TURN:

**Triangle: base=10 cm, height=7 cm. Rectangle has same area, length=14 cm. Find rectangle width.**

Step 1: Find the area of the triangle.

A)  $35 \text{ cm}^2$  B)  $70 \text{ cm}^2$  C)  $17 \text{ cm}^2$  D)  $140 \text{ cm}^2$

Work space:

Step 2: Write the equation for the rectangle (area =  $35 \text{ cm}^2$ , length = 14).

A)  $14 + w = 35$  B)  $14 * w = 35$  C)  $2(14+w) = 35$  D)  $14^2 + w = 35$

Work space:

Step 3: Find the width of the rectangle.

A)  $w = 3.5 \text{ cm}$  B)  $w = 2 \text{ cm}$  C)  $w = 2.5 \text{ cm}$  D)  $w = 4 \text{ cm}$

Work space:

Answer Key: Step 1: A)  $35 \text{ cm}^2$  | Step 2: B)  $14 * w = 35$  | Step 3: C)  $w = 2.5 \text{ cm}$

## Problem 15: Parallel Lines & Transversals

---

### [ CONCEPT ]

When parallel lines are cut by a transversal:

Corresponding angles: EQUAL

Alternate interior angles: EQUAL

Co-interior (same-side) angles: sum = 180 degrees (supplementary)

### [ WORKED EXAMPLE ]

Co-interior angles: one = 110 deg.

$x + 110 = 180 \Rightarrow x = 70$  degrees

### YOUR TURN:

**Parallel lines cut by a transversal. Alternate interior angles:  $(5x-10)$  degrees and  $(3x+20)$  degrees.**

Step 1: Alternate interior angles are equal. Write the equation.

A)  $5x-10+3x+20=180$  B)  $5x-10=3x+20$  C)  $5x+3x=180$  D)  $5x-10=180$

Work space:

Step 2: Solve for x.

A)  $x = 10$  B)  $x = 15$  C)  $x = 20$  D)  $x = 25$

Work space:

Step 3: What is the measure of each angle?

A) 55 and 75 B) 65 and 65 C) 85 and 85 D) 65 and 75

Work space:

Answer Key: Step 1: B)  $5x-10=3x+20$  | Step 2: B)  $x = 15$  | Step 3: B) 65 and 65

## Problem 16: Similar & Congruent Triangles

---

### [ CONCEPT ]

Congruent triangles (same shape AND size): SSS, SAS, ASA, AAS, HL

Similar triangles (same shape, different size): AA, SAS~, SSS~

In similar triangles: corresponding sides are PROPORTIONAL

### [ WORKED EXAMPLE ]

Similar triangles: 3,4,5 and 6,?,10. Scale =  $6/3 = 2$ . ? =  $4 \cdot 2 = 8$

### YOUR TURN:

**Similar triangles: Triangle ABC has sides 8, 12, 16. Triangle DEF has shortest side = 6. Find other sides of DEF.**

Step 1: Find scale factor from ABC to DEF using shortest sides.

A) Scale =  $\frac{3}{4}$  B) Scale =  $\frac{4}{3}$  C) Scale =  $\frac{1}{2}$  D) Scale = 2

Work space:

Step 2: Find DEF side corresponding to 12.

A) 8 B) 10 C) 9 D) 16

Work space:

Step 3: Find DEF side corresponding to 16.

A) 14 B) 10 C) 12 D) 8

Work space:

Answer Key: Step 1: A) Scale =  $\frac{3}{4}$  | Step 2: C) 9 | Step 3: C) 12

## Problem 17: Volume & Surface Area

---

### [ CONCEPT ]

Rectangular prism:  $V = l \cdot w \cdot h$

Cylinder:  $V = \pi \cdot r^2 \cdot h$

Cone:  $V = \frac{1}{3} \cdot \pi \cdot r^2 \cdot h$

Pyramid:  $V = \frac{1}{3} \cdot B \cdot h$

### [ WORKED EXAMPLE ]

Cylinder  $r=3$ ,  $h=10$ :  $V = \pi(3^2)(10) = 90\pi$  approx 282.7 cubic units

### YOUR TURN:

**Cone: radius=6 cm, height=8 cm. Cylinder has same radius and same volume. Find cylinder height.**

Step 1: Calculate the cone volume.

A)  $96\pi \text{ cm}^3$  B)  $288\pi \text{ cm}^3$  C) Cannot determine D)  $48\pi \text{ cm}^3$

Work space:

Step 2: Set cylinder volume =  $96\pi$ . With  $r=6$ , write equation.

A)  $\pi(6)h=96\pi$  B)  $\pi(36)h=96\pi$  C)  $36\pi \cdot h=96$  D)  $6\pi \cdot h=96\pi$

Work space:

Step 3: Solve for  $h$ .

A)  $h = 3 \text{ cm}$  B)  $h = \frac{8}{3} \text{ cm}$  C)  $h = 4 \text{ cm}$  D)  $h = 6 \text{ cm}$

Work space:

Answer Key: Step 1: A)  $96\pi \text{ cm}^3$  | Step 2: B)  $\pi(36)h=96\pi$  | Step 3: B)  $h = \frac{8}{3} \text{ cm}$

## Problem 18: Coordinate Geometry

---

### [ CONCEPT ]

Distance formula:  $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

Midpoint formula:  $M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

### [ WORKED EXAMPLE ]

Distance between (1,2) and (5,5):

$d = \sqrt{(5-1)^2 + (5-2)^2} = \sqrt{16+9} = \sqrt{25} = 5$

### YOUR TURN:

**Points A(-2, 3) and B(6, -1). Find distance AB and midpoint M.**

Step 1: Calculate  $(x_2-x_1)^2 + (y_2-y_1)^2$ .

A)  $64+16=80$  B)  $8+4=12$  C)  $16+16=32$  D)  $64+4=68$

Work space:

Step 2: What is the distance AB?

A)  $2\sqrt{5}$  B)  $4\sqrt{5}$  C)  $\sqrt{80}=4\sqrt{5}$  D) Both B and C correct

Work space:

Step 3: Find midpoint M of AB.

A)  $M=(4,2)$  B)  $M=(2,1)$  C)  $M=(4,-1)$  D)  $M=(2,2)$

Work space:

Answer Key: Step 1: A)  $64+16=80$  | Step 2: D) Both B and C correct | Step 3: B)  $M=(2,1)$

## Problem 19: Circle Theorems

---

### [ CONCEPT ]

Central angle = intercepted arc

Inscribed angle =  $(1/2) \times$  intercepted arc

Inscribed angle in semicircle = 90 degrees

Tangent is perpendicular to radius at point of tangency

### [ WORKED EXAMPLE ]

Inscribed angle intercepts arc of 100 degrees:

Inscribed angle =  $(1/2)(100) = 50$  degrees

### YOUR TURN:

**Central angle AOB = 140 degrees. Point C is on the major arc. Find inscribed angle ACB.**

Step 1: Central angle AOB = 140 deg. What is the minor arc AB?

A) 70 deg B) 220 deg C) 140 deg D) 280 deg

Work space:

Step 2: Apply inscribed angle theorem (C on major arc intercepts minor arc 140 deg).

A) Angle ACB = 140 B) Angle ACB = 70 C) Angle ACB = 280 D) Angle ACB = 220

Work space:

Step 3: If C used the major arc (220 deg), what would the inscribed angle be?

A) 110 deg B) 100 deg C) 140 deg D) 220 deg

Work space:

Answer Key: Step 1: C) 140 deg | Step 2: B) Angle ACB = 70 | Step 3: A) 110 deg

## Problem 20: Transformations

---

### [ CONCEPT ]

Translation:  $(x,y) \rightarrow (x+a, y+b)$

Reflection over x-axis:  $(x,y) \rightarrow (x,-y)$

Reflection over y-axis:  $(x,y) \rightarrow (-x,y)$

Rotation 90 deg CCW:  $(x,y) \rightarrow (-y,x)$

### [ WORKED EXAMPLE ]

Reflect  $(3,-2)$  over x-axis:

Result:  $(3, 2)$  -- only y-coordinate changes sign

**YOUR TURN:**

**Point P(4, -3) undergoes these transformations. Find its final position.**

Step 1: Reflect P(4,-3) over the y-axis.

- A) (4,3) B) (-4,-3) C) (3,4) D) (-4,3)

Work space:

Step 2: Translate result (-4,-3) by vector (3, 7).

- A) (-7,-10) B) (-1,4) C) (1,-4) D) (7,4)

Work space:

Step 3: Rotate (-1,4) by 90 deg counterclockwise. Use  $(x,y) \rightarrow (-y,x)$ .

- A) (4,1) B) (-4,-1) C) (1,-4) D) (-4,1)

Work space:

Answer Key: Step 1: B) (-4,-3) | Step 2: B) (-1,4) | Step 3: B) (-4,-1)

---

**Total Score:**

**/ 100 points**

**Time:**

\_\_\_\_\_

**Grade:**

\_\_\_\_\_

Great work completing this worksheet! Review any missed problems carefully.