

Unit 1 Test Study Guide

Directions: Show all your work in order to receive full credit.

Formulas:

Area of a Triangle: $A = \frac{1}{2} \cdot b \cdot h$

Area of a Parallelogram: $A = b \cdot h$

Area of a Kite: $A = \frac{1}{2} \cdot d_1 \cdot d_2$

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

Area of a Rectangle/Square: $A = b \cdot h$

Area of a Rhombus: $A = b \cdot h$ or $A = \frac{1}{2} \cdot d_1 \cdot d_2$

Area of a Trapezoid: $A = \frac{1}{2} \cdot h(b_1 + b_2)$

1. Write an equation for the line that is parallel to $y = \frac{1}{3}x - 2$ and passes through $(-3, 4)$.

$$y - 4 = \frac{1}{3}(x + 3)$$

2. Given the line $y = \frac{2}{3}x + 1$, which of the following represents a line **perpendicular** to the given line

$$m = -\frac{3}{2}$$

(circle all that apply)?

A. $y - 2 = \frac{3}{2}(x - 1)$

B. $y + 3 = \frac{2}{3}(x + 1)$

C. $y - 5 = -\frac{3}{2}(x - 5)$

D. $3y = 2x - 5$

E. $2y = -3x + 4$

F. $4y + 6x = 0$

3. Given the line $y = \frac{1}{2}x - 7$, which of the following represents a line **parallel** to the given line (circle all that apply)?

$$m = \frac{1}{2}$$

A. $x + 2y = 1$

B. $x - 2y = 7$

C. $y = 2x + 7$

D. $-2y + 5 = -1(x + 3)$

E. $2y - x = 4$

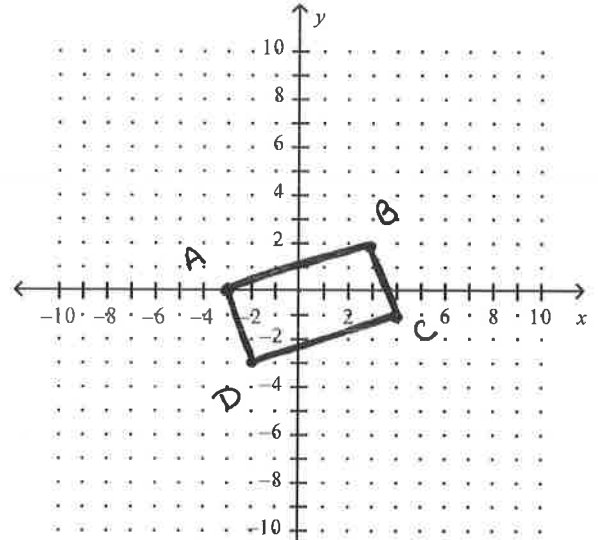
F. $x = 3 - 2y$

4. If the outside of a plot of land has the endpoints of: $A(-3, 0)$, $B(3, 2)$, $C(4, -1)$, and $D(-2, -3)$, complete the following:

a) Classify quadrilateral ABCD. Justify your reasoning using the slope AND distance formulas.

- Opposite sides are parallel
- Opposite sides are congruent
- Forms four right angles

⇒ It's a Rectangle!



$\overline{AB}: \sqrt{40} = 2\sqrt{10}$	$m = \frac{1}{3}$
$\overline{BC}: \sqrt{10}$	$m = -3$
$\overline{CD}: \sqrt{40} = 2\sqrt{10}$	$m = \frac{1}{3}$
$\overline{AD}: \sqrt{10}$	$m = -3$

b) Determine the perimeter of the quadrilateral above.

$$2\sqrt{10} + \sqrt{10} + 2\sqrt{10} + \sqrt{10}$$

$$= \boxed{6\sqrt{10} \text{ units}}$$

c) Determine the area of the figure

$$2\sqrt{10} \cdot \sqrt{10}$$

$$= \boxed{20 \text{ units}^2}$$

5. Two points that lie at $(3, 4)$ and $(27, y)$ are 25 units apart. Find all possible values of y . Show evidence to support your work.

$$25 = \sqrt{(27-3)^2 + (y-4)^2}$$

$$25 = \sqrt{576 + (y-4)^2}$$

$$625 = 576 + (y-4)^2$$

$$49 = (y-4)^2$$

$$\pm 7 = y-4$$

$$4 \pm 7 = y$$

\swarrow $y = 4+7 = 11$
 \searrow $y = 4-7 = -3$

y = -3, 11

6. Given the equation of a circle is $(x + 1)^2 + (y - 3)^2 = 25$, which of the following are true (**circle all the apply**)

- A. The point $(-1, -2)$ lies on the circle
- B. The center is $(1, 3)$
- C. The diameter is 5
- D. The radius is 5
- E. Area = 10π
- F. Circumference = 10π

7. Convert the equation from general form to standard form, then label the center and radius:

$$x^2 + y^2 - 10y + 12x + 52 = 0$$

Center: $(-6, 5)$

Radius: 3

$$x^2 + 12x + 36 + y^2 - 10y + 25 = -52 + 36 + 25$$

$$(x+6)^2 + (y-5)^2 = 9$$

8. For each equation below, fill in the blanks corresponding to key graph features and sketch a graph of the equation that includes those key features.

a) $(y - 1)^2 = -12(x + 2)$ opens left

Vertex: $(-2, 1)$

Focus: $(-5, 1)$

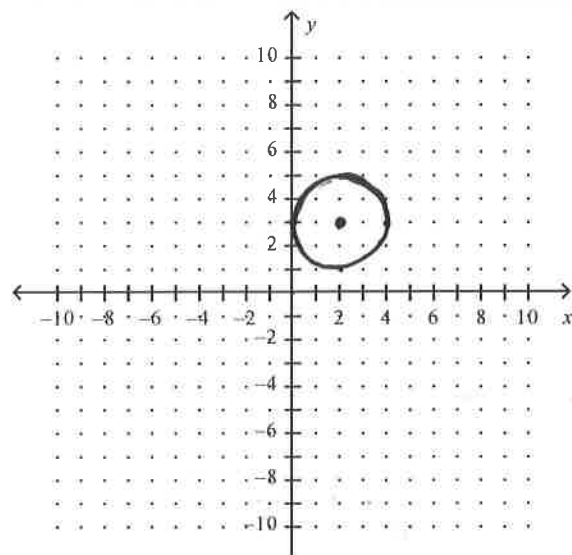
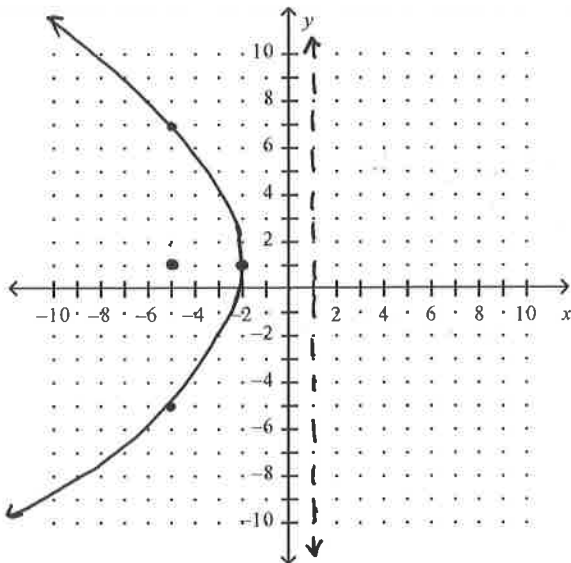
Directrix: $x = 1$

$p = -3$

b) $(x - 2)^2 + (y - 3)^2 = 4$

Center: $(2, 3)$

Radius: 2

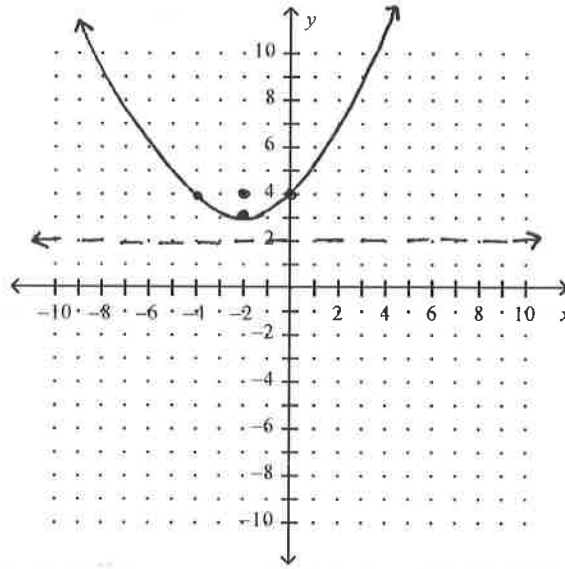


c) $(x + 2)^2 = 4(y - 3)$ opens up
 $p=1$

Vertex: $(-2, 3)$

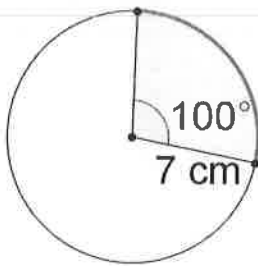
Focus: $(-2, 4)$

Directrix: $y=2$



9. Find the length of the arc for each of the following circles. Give your solution as an exact value and as a decimal approximation.

a)



$$\frac{s}{2\pi(7)} = \frac{100^\circ}{360^\circ}$$

$$s = \frac{35\pi}{9} \approx 12.2 \text{ cm}$$

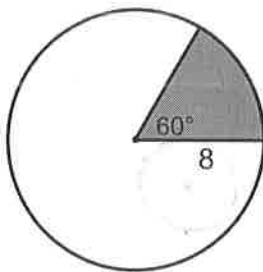
b) A 75° arc of a circle with a diameter of 20 cm. ↖ radius = 10 cm

$$\frac{s}{2\pi(10)} = \frac{75^\circ}{360^\circ}$$

$$s = \frac{25\pi}{6} \approx 13.1 \text{ cm}$$

10. Find the area of the sectors below. Give your solution as an exact value and as a decimal approximation.

a)



$$\frac{A}{\pi(8)^2} = \frac{60^\circ}{360^\circ}$$

$$A = \frac{32\pi}{3} \approx 33.5 \text{ units}^2$$

b) A 120° arc of a circle with a radius of 12 m.

$$\frac{A}{\pi(12)^2} = \frac{120^\circ}{360^\circ}$$

$$A = 48\pi \approx 150.8 \text{ m}^2$$

Integrated Math III

Name: _____

Per: _____ **Date:** _____

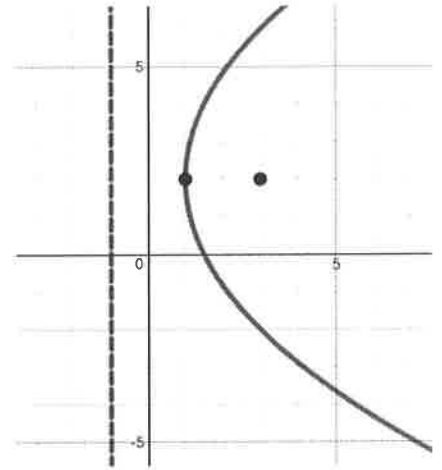
11. Write the equation of the parabola shown in the image below:

Focus: $(3, 2)$

Directrix: $x = -1$

P-value: 2

Equation: $(y - 2)^2 = 8(x - 1)$



12. Write the equation of the parabola shown in the image below:

Focus: $(-3, 1)$

Directrix: $y = 7$

P-value: 3

Equation: $(x + 3)^2 = -12(y - 4)$

