PC11 Ch 4 Hand-in Very Partial

Monday, February 13, 2023   10:06 AM
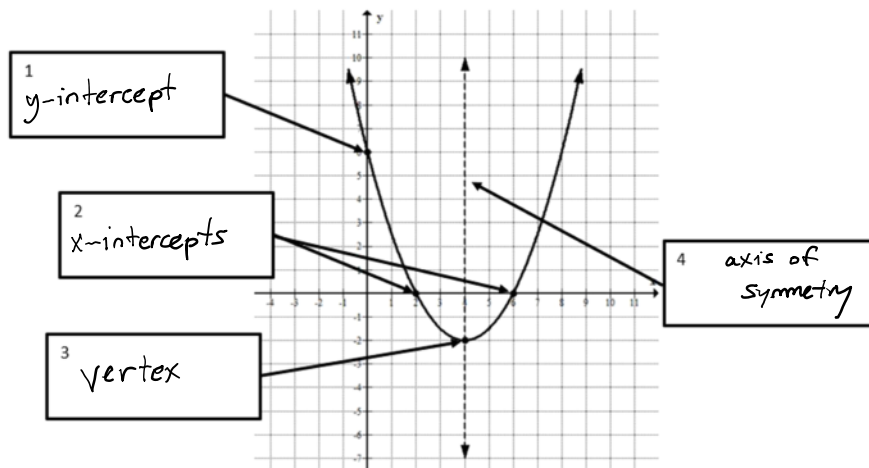
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PreCalc 11 Chapter 4 Assignment – hand in for completion marks

Name: _____Key_____

Complete the following questions showing all work and steps where applicable.

1a) Add the correct term to name each characteristic shown in the boxes.

1 y-intercept

2 x-intercepts

3 vertex

4 axis of symmetry

b) vertex coordinates: $(4, -2)$

c) minimum of this function is: -2

d) axis of symmetry equation: $x = 4$

e) x-intercept coordinates are: $(2, 0)$ and $(6, 0)$
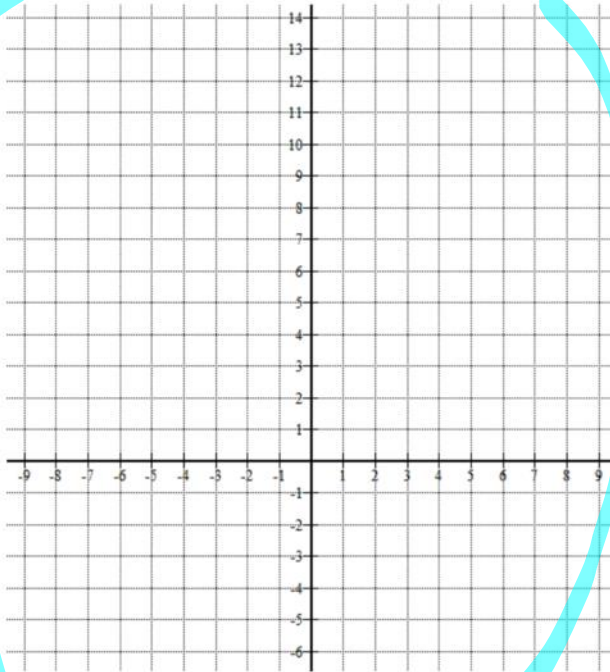
f) y-intercept coordinates: $(0, 6)$

g) range: $y \geq -2$

2. Complete the table below.

Function	Direction of opening	Vertex	Axis of Symmetry Equation	Is it congruent (exact same size/shape) to $y = x^2$?
$y = x^2$	up	$(0,0)$	$x = 0$	yes
$y = 3x^2 + 5$	up	$(0,5)$	$x = 0$	no
$y = -x^2 - 9$				
$y = (x+6)^2$				
$y = 5(x-2)^2$	up	$(2,0)$	$x = 2$	no

3. **Accurately graph** each function below on the provided grid. Correctly plot 7 points for each graph.
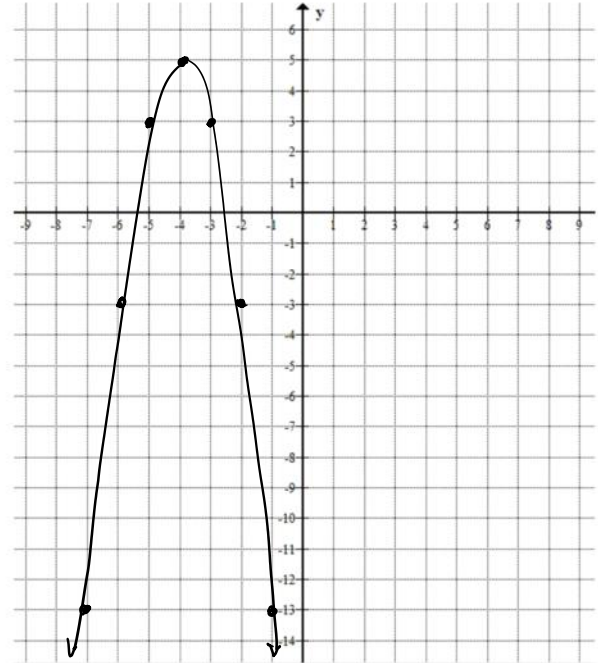
a) $y = (x-1)^2 - 2$

b) $y = -2(x+4)^2 + 5$

$V = (-4, 5)$

Domain:

Range:

Domain: $X \in \mathbb{R}$

Range: $y \leq 5$

4. Use the following information, determine the equation of the quadratic function.

The vertex of the graph is at (-3, 2) and one of the x-intercepts is at (-1,0).

$$y = a(x+3)^2 + 2$$

Substitute in $(-1, 0)$

$$0 = a(-1+3)^2 + 2$$
$$0 = a(2)^2 + 2$$
$$0 = 4a + 2$$
$$-2 \qquad\qquad -2$$
$$\frac{-2}{4} = \frac{4a}{4}$$
$$\frac{-2}{4} = a \quad, \quad \text{so } a = -\frac{1}{2}$$

$$\boxed{y = -\frac{1}{2}(x+3)^2 + 2}$$

5. Give the requested characteristics of this function: $y = -2(x+1)^2 + 8$

a) coordinates of the vertex

$(-1, 8)$

b) direction of opening   down

⌒

c) equation of the axis of symmetry

$x = -1$

d) coordinates of the x-intercepts

Let $y = 0$

$0 = -2(x+1)^2 + 8$

$\dfrac{-8}{-2} = \dfrac{-2(x+1)^2}{-2}$

$4 = (x+1)^2$

$\pm\sqrt{4} = \sqrt{(x+1)^2}$

$\pm 2 = x + 1$

$x + 1 = 2$

$x = 2 - 1$

$x = 1$

$(1, 0)$

$x + 1 = -2$

$x = -2 - 1$

$x = -3$

$(-3, 0)$

e) coordinates of the y-intercept

Let $x = 0$

$y = -2(0+1)^2 + 8$

$y = -2(1)^2 + 8$

$y = -2(1) + 8$

$y = -2 + 8$

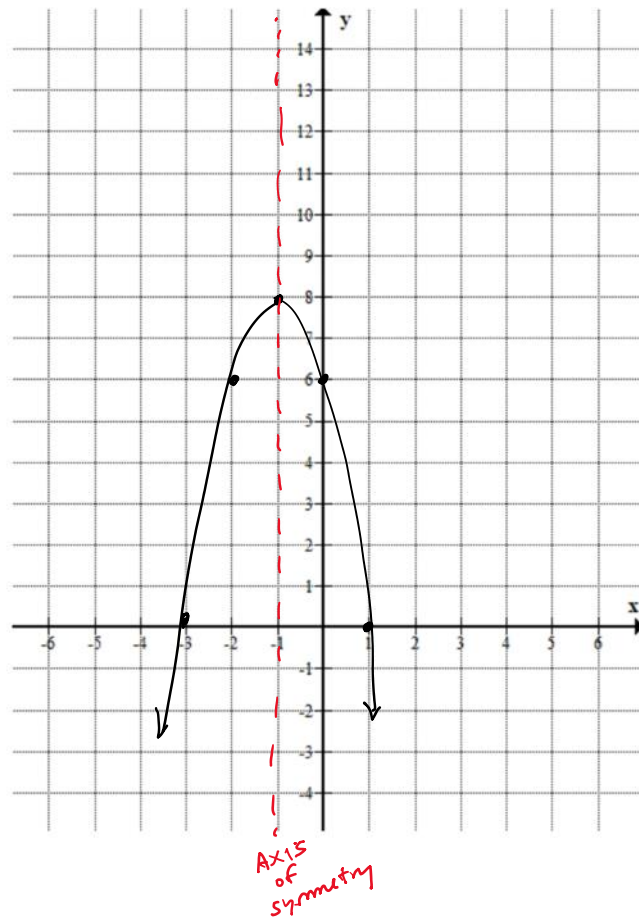$y = 6$ $(0, 6)$

f) value of the Max or Min

$max = 8$

g) domain

$x \in \mathbb{R}$

h) range

$y \leq 8$

i) For the parabola's graph, **accurately plot 5 points. Using a dotted line, graph the axis of symmetry.**

Axis of symmetry

6. Convert each of the following equations to standard/vertex form by completing the square.

a) $y = x^2 - 4x + 9$ $\qquad \left(\dfrac{-4}{2}\right)^2 = 4$

$y = x^2 - 4x + 4 - 4 + 9$

$y = (x^2 - 4x + 4) + 5$

$\boxed{y = (x-2)^2 + 5}$

b) $y = 2x^2 - 12x + 16$

c) $y = 2x^2 - 8x + 9$ $\qquad \left(\dfrac{-4}{2}\right)^2 = 4$

$y = 2(x^2 - 4x + 4 - 4) + 9$

$y = 2(x^2 - 4x + 4) - 8 + 9$

$\boxed{y = 2(x-2)^2 + 1}$

7. Complete the table below.

	$y = x^2 + 6x + 8$	$y = -3x^2 + 14x + 5$
direction of opening		down
Coordinates of the y-intercept		Let $x = 0$ $y = -3(0)^2 + 14(0) + 5$ $y = 5$ $(0, 5)$
Coordinates of the x-intercepts *Hint: convert to factored form*		$y = -3x^2 + 14x + 5$ $y = -(3x^2 - 14x - 5)$ $AC = -15 \brace Sum = -14$ $\}$ $-15, 1$ $y = -(3x^2 - 15x + 1x - 5)$ $y = -[3x(x-5) + 1(x-5)]$ $y = -[(x-5)(3x+1)]$ $x - 5 = 0$ $3x+1=0$ $x = 5$ $3x = -1$ $x = -\frac{1}{3}$ $\boxed{(5, 0) \text{ and } (-\frac{1}{3}, 0)}$
equation of the axis of symmetry *Hint: you do NOT have to change to vertex form to find this*	It's halfway between the x-intercepts:	$x = \dfrac{5 + -\frac{1}{3}}{2}$ $x = \dfrac{15/3 + -1/3}{2}$ $x = \dfrac{14/3}{2}$ $x = 14/3 \cdot \frac{1}{2}$ $x = \frac{14}{6}$ $\boxed{x = 7/3}$