

Chapter 1 Prerequisite Skills

1. For each function, identify the following:

- the vertex
- whether the vertex is a maximum or minimum value
- the axis of symmetry
- the direction of opening
- the domain and range

a) $f(x) = (x - 3)^2 + 4$

b) $f(x) = \frac{1}{2}(x + 5)^2 - 7$

c) $f(x) = -3x^2 + 15$

d) $f(x) = -\frac{1}{3}x^2 + \frac{1}{3}x - 2$

2. Write each function in vertex form.

a) $y = x^2 - 24x + 10$

b) $y = 5x^2 + 40x - 27$

c) $y = -2x^2 + 8x$

d) $y = -30x^2 - 60x + 105$

3. Graph each quadratic function in #2. Label the vertex and x-intercepts (if any exist), rounded to the nearest tenth of a unit.

4. Evaluate.

a) $|-7|$

b) $|4 - 9|$

c) $3|6| - 24$

d) $|-6 + 3| + \left|4\left(-\frac{3}{2}\right)\right|$

5. Graph.

a) $y = |3x + 4|$

b) $y = |x^2 - 5|$

c) $y = |2x^2 - x - 1|$

d) $y = \left|-\frac{1}{2}x - 3\right|$

6. Solve graphically.

a) $|2x - 2| = 9$

b) $|3x - 7| = x + 1$

c) $|x^2 - 6| = 3$

d) $|x^2 - 4x| = 5$

7. Solve each equation in #6 algebraically.

8. Graph the reciprocal of each function. Identify any vertical asymptotes and non-permissible values.

a) $f(x) = 4x - 7$

b) $f(x) = -2x + 5$

c) $f(x) = x^2 - 16$

d) $f(x) = x^2 - x - 6$

***This skills practice reviews Pre-Calc11 Units 3 & 7. Use your Pre-Calc11 notes (also found on the KRSS Moodle site) to assist you.**

Pre-Calc 12

KEY

1. a) vertex (3, 4), minimum; axis of symmetry $x = 3$;
opens upward; domain $\{x \mid x \in \mathbb{R}\}$;

range $\{y \mid y \geq 4, y \in \mathbb{R}\}$

b) vertex $(-5, -7)$, minimum; axis of symmetry
 $x = -5$; opens upward; domain $\{x \mid x \in \mathbb{R}\}$;

range $\{y \mid y \geq -7, y \in \mathbb{R}\}$

c) vertex (0, 15), maximum; axis of symmetry $x = 0$;
opens downward; domain $\{x \mid x \in \mathbb{R}\}$;

range $\{y \mid y \leq 15, y \in \mathbb{R}\}$

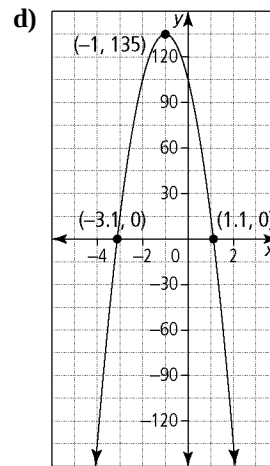
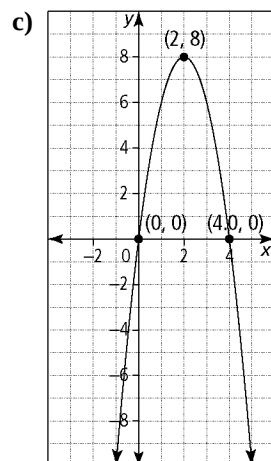
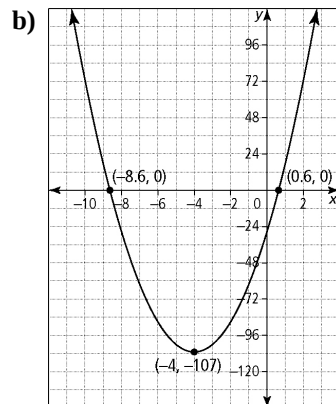
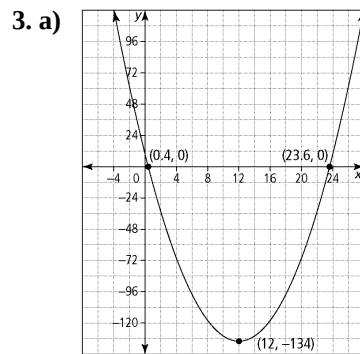
d) vertex $(-\frac{1}{2}, -\frac{23}{13})$, maximum; axis of symmetry

$x = \frac{1}{2}$; opens downward; domain $\{x \mid x \in \mathbb{R}\}$;

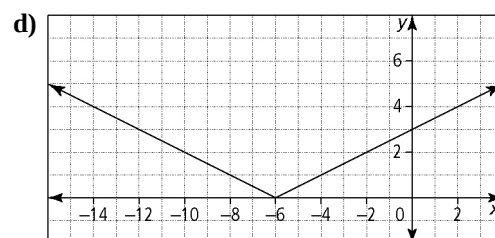
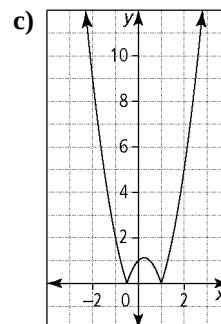
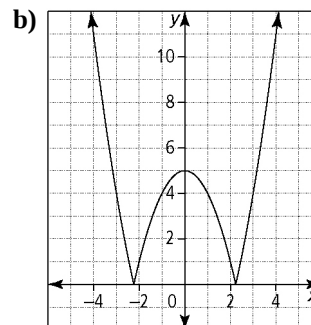
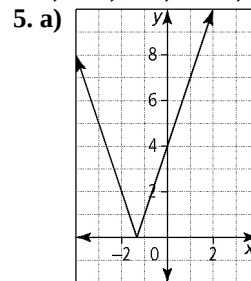
range $\{y \mid y \leq \frac{-23}{12}, y \in \mathbb{R}\}$

2. a) $y = (x - 12)^2 - 134$ **b)** $y = 5(x + 4)^2 - 107$

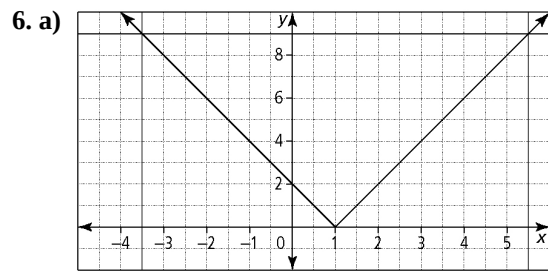
c) $y = -2(x - 2)^2 + 8$ **d)** $y = -30(x + 1)^2 + 135$



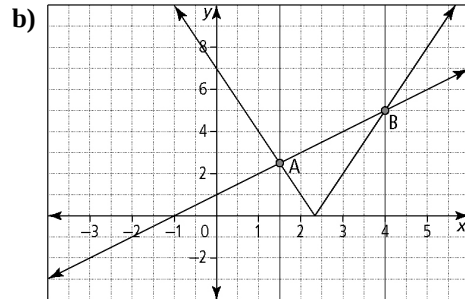
4. a) 7 **b)** 5 **c)** -6 **d)** 9



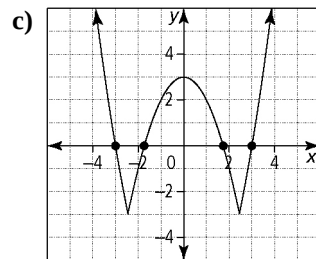
Pre-Calc 12



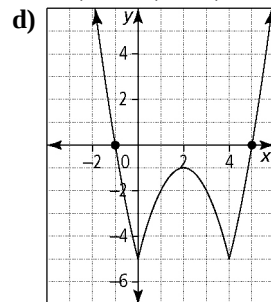
$x = 3.5, 5.5$



$x = \frac{3}{2}, x = 4$



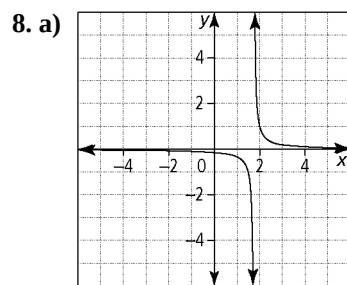
$x = -3, -1.73, 1.73, 3$



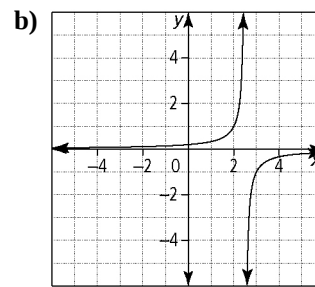
$x = -1, 5$

7. a) $x = -\frac{7}{2}, \frac{11}{2}$ b) $x = 1.5, 4$

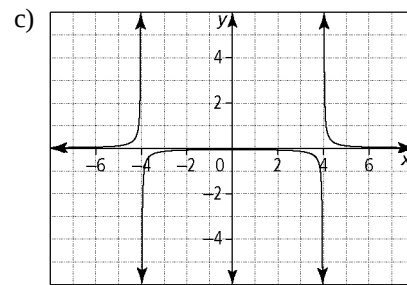
c) $x = -3, \sqrt{3}, -\sqrt{3}, 3$ d) $x = -1, 5$



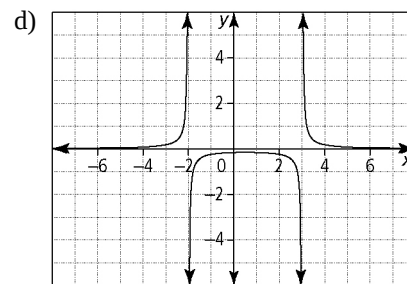
asymptote at $x = \frac{7}{4}; x \neq \frac{7}{4}$



asymptote at $x = \frac{5}{2}; x \neq \frac{5}{2}$



asymptotes at $x = 4, -4; x \neq \pm 4$



asymptotes at $x = 3, -2; x \neq 3, -2$