1.

Determine the domain and range of the function defined as $g(x) = \sqrt{x + 7}$. Express your answer in interval notation.

2.

For $f(x) = x^2 + 3$ evaluate and simplify:

(a) $f(x + 1) =$ (b) $f(x + h) =$ (c) $f(x + h) - f(x) =$ (d) $\dfrac{f(x + h) - f(x)}{h} =$

3. For $y = (x - 4)^2$ determine wether the graph opens up or down, find the vertex, find the axis of symmetry, find the $x-$ and $y-$ intercepts. Sketch the graph of the function.

4. For $f(x) = -2x - x^2$ determine wether the graph opens up or down, find the vertex, find the axis of symmetry, find the $x-$ and $y-$ intercepts. Sketch the graph of the function.

5. Find the equation of the quadratic function that has the vertex $(2, 5)$ and passes through the point $(4, 1)$.

6. True or False:

(a) _____ If the slope of a line is positive the line is increasing over its domain.

(b) _____ The slope of the line is the average rate of change of the linear function.

(c) _____ The x-coordinate of the vertex of the graph $y = ax^2 + bx + c$ is $-\frac{b}{2a}$.

(d) _____ The graph of $f(x) = x + 2 - 4x^2$ opens up.

(e) _____ The $y-$coordinate of the vertex of $f(x) = -x^2 + 6x + 7$ is $f(3)$.

(f) _____ If the discriminant is zero, that is when $b^2 - 4ac = 0$, then the graph of $f(x) = ax^2 + bx + c$ will touch the x-axis at its vertex.

7. For the functions $f(x) = x + 4$ and $g(x) = x^2 - 8$, graph f and g on the same axis, then solve for $f(x) = g(x)$.

8. For the quadratic function $f(x)$ given below, determine whether f has a maximum value or a minimum value. Then find this value.

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

9. Find the point on the line $y = x$ that is closest to the point $(-2, 4)$.

10.

$$If \ f(x) = \begin{cases} x + 4, & -3 \le x < 1 \\ 4, & x = 1 \\ -x + 3, & x > 1 \end{cases},$$
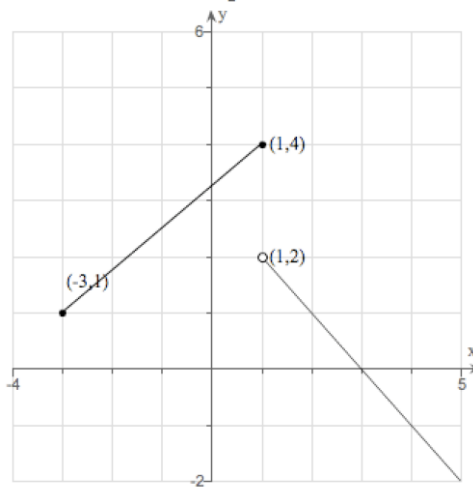
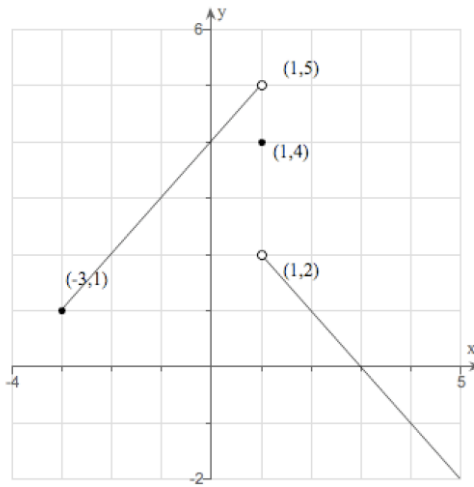(a) Evaluate the following

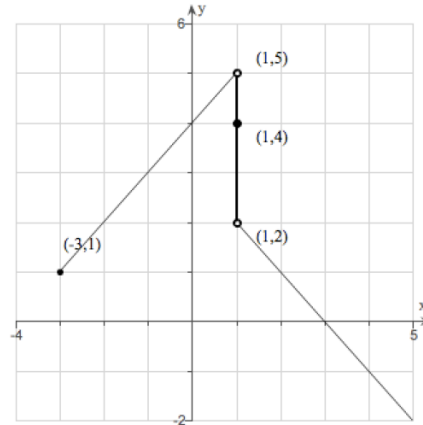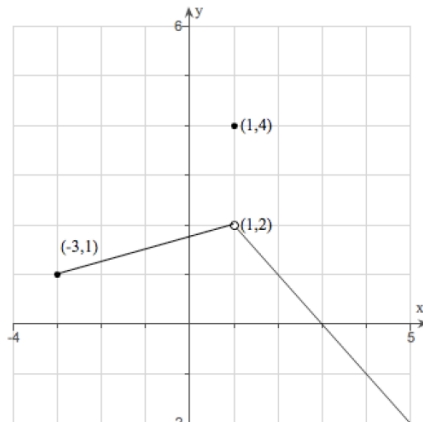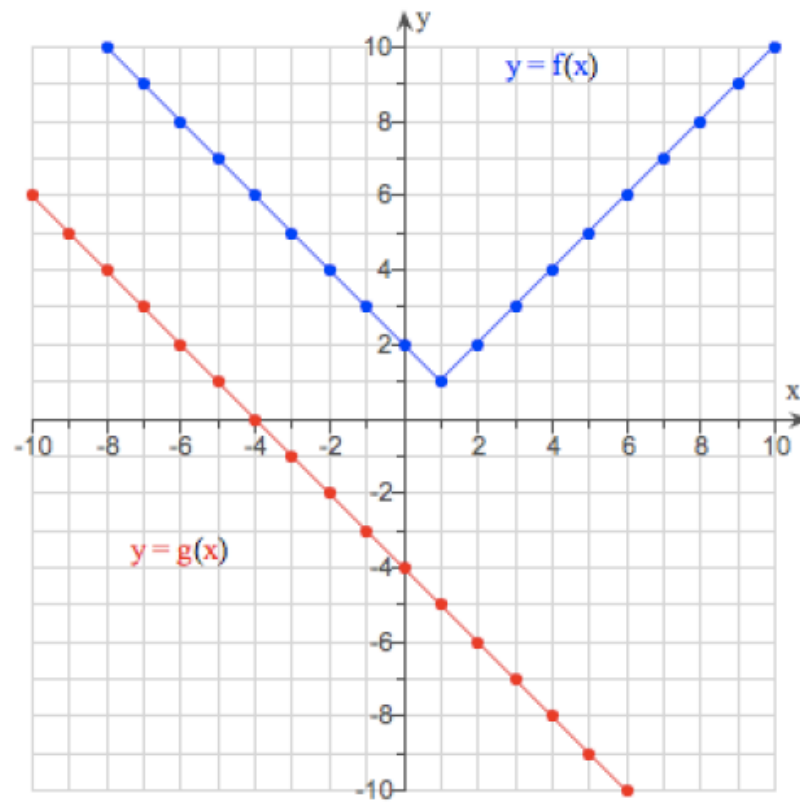   i. $f(-2) =$ ii. $f(0) =$ iii. $f(1) =$ iv. $f(4) =$

    (b) Choose the correct graph of this function below.

11.

For the graph shown below determine:

(a) $f(-3) =$

(b) $g(2) =$

(c) $(f + g)(4) =$

(d) $(fg)(-6) =$

(e) $(g \circ f)(2) =$

(f) $(f \circ g)(1) =$