Convert from Standard to Vertex Form:

1. $y = x^2 + 4x - 14$

2. $y = x^2 - 4x + 8$

3. $y = x^2 - 12x - 13$

4. $y = x^2 + 40x + 77$

Convert from Vertex to Standard Form:

1. $y = 6(x-4)^2 - 1$

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

3. $y = (x-2)^2 + 7$

4. $y = 2(x+8)^2 + 10$

Characteristics of Graphs:

Vertex: _____ Axis of Symmetry:_____

Max/Min Value: _____

Y-Intercept: _____ Zeroes: _____

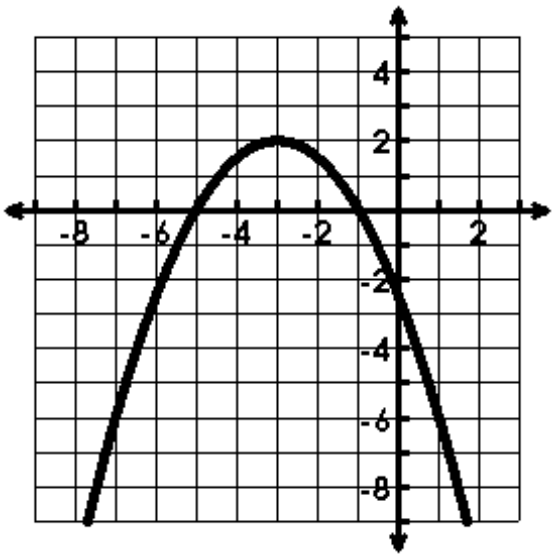
Domain: _____ Range: _____

Interval of Increase:_____

Interval of Decrease:_____

End Behavior: as $x \rightarrow -\infty$, $f(x) \rightarrow$ _____; as $x \rightarrow \infty$, $f(x) \rightarrow$ _____

Rate of change on the interval $-1 \leq x \leq 0$:_____



Vertex: _____ Axis of Symmetry:_____

Max/Min Value: _____

Y-Intercept: _____ Zeroes: _____

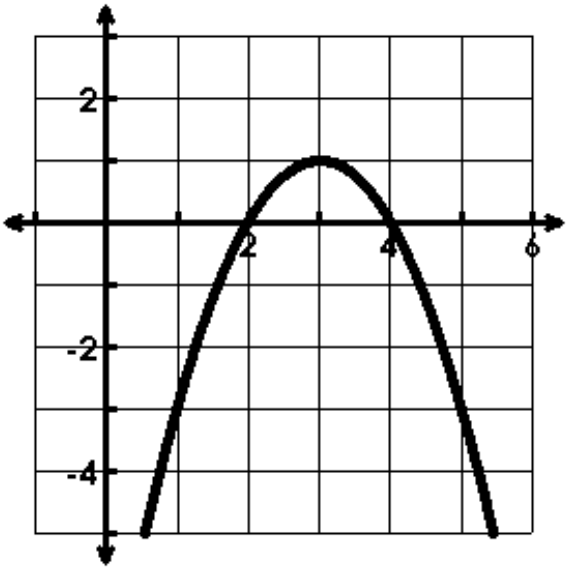
Domain: _____ Range: _____

Interval of Increase:_____

Interval of Decrease:_____

End Behavior: as $x \rightarrow -\infty$, $f(x) \rightarrow$ _____; as $x \rightarrow \infty$, $f(x) \rightarrow$ _____

Rate of change on the interval $1 \leq x \leq 3$:_____



Application:

1. The cost, C, in dollars, of operating a machine per day is given by the equation $C = 2t^2 - 84t + 1025$, where t is the time, in hours, the machine operates.

   a) What is the minimum cost of running the machine? For how many hours must the machine run to reach this minimum cost?

2. The height of ball, h metres, t seconds after it is thrown is given by the equation

$$h = -5(t - 3)^2 + 46.5$$

   a) What was the maximum height of the ball?

   b) How long does it take the ball to reach its maximum height?

3. A football quarterback passed the ball to a receiver 40 m downfield. The path of the ball can be described by the equation $h = -0.01d^2 + 0.4d + 2$.

   a) What was the maximum height of the ball? What was the horizontal distance of the ball from the quarterback at its maximum height?

4. A small rocket is launched from a height of 72 feet. The height of the rocket in feet, *h*, is represented by the equation $h(t) = -16t^2 + 64t + 72$, where *t* = time, in seconds. Find (a) how many seconds until the rocket reaches its maximum height, and (b) how many feet high it will be at that point.