NAME_____DATE_____PERIOD_____

Write each equation in vertex form. Then, identify the vertex, direction of opening, and the max or min value.

1.) $y = x^2 + 16x + 71$

2.) $y = x^2 - 2x - 5$

3.) $y = x^2 - 12x + 46$

4.) $y = x^2 - 6x + 5$

5.) $y = x^2 + 10x + 33$

6.) $y = x^2 + 6x + 7$

7.) $y = x^2 + 4x$

8.) $y = -x^2 - 14x - 59$

9.) $y = 2x^2 + 36x + 170$

10.) $y = 4x^2 + 64x + 156$

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11.) A certain sock company's annual profit (in millions of dollars) as a function of the price per pair of socks (in dollars) can be modeled by the following equation.

$$y = -3(x-5)^2 + 25$$

What price should the company sell its socks for to maximize profit?_____

What is the maximum profit they will receive?_____

12.) Drew is standing on a balcony and throws a football to his friend on ground level. The path of the football can be modeled by the equation,

$$h(x) = -(x-2)^2 + 16$$

Where the height of the ball is represented in meters, *x* seconds after being thrown. What is the height of the ball at the time it is thrown?_____

What is the maximum height of the ball?_____

How long does it take for the ball to reach the maximum height?_____

13.) The graph of *g* is a vertical shrink by a factor of $\frac{1}{4}$, has a reflection in the x-axis (opens down), moves right 5 and down 4 of the graph of $f(x) = x^2$. Write the function for $g(x)$.

14.) How does the graph of $h(x) = 3(x+2)^2 - 5$ compare to the graph of $f(x) = x^2$.

15.) Write the equation of a parabola whose a value is -4 and has a vertex at $(9, 10)$.
