PreCalculus 4.3 practice and 4.4 Application problems   Name_____
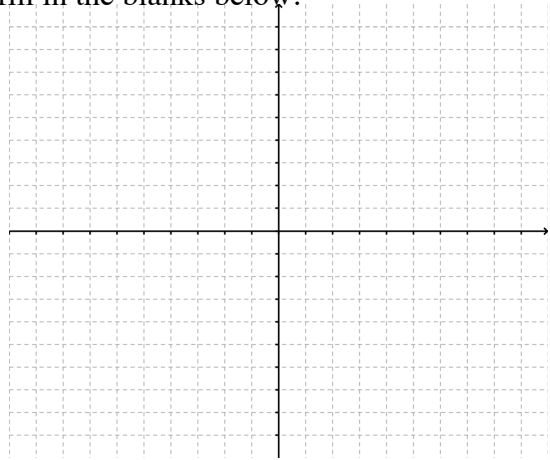
1.   Rewrite the function $f(x) = -4x^2 + 16x + 14$ in <u>vertex form.</u> Show all work!

2.   Graph the function, showing **at least five points**. Then fill in the blanks below.

$f(x) = -3x^2 - 3x - 2$

Coordinates of the Vertex _____   Increasing Interval(s)_____

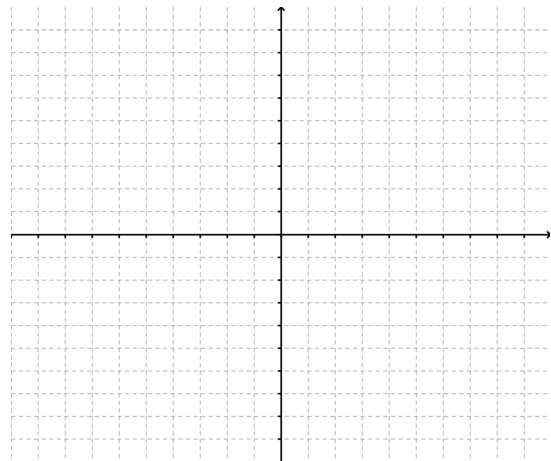Equation for the Axis of Symmetry _____   Decreasing Interval(s) _____

x-intercepts _____   Domain _____

y-intercepts _____   Range_____

3.   Graph the function $g(x) = 2(x-3)^2 + 1$.
        <u>Show at least five points!</u>

4.   Determine the equation of the quadratic function that has a vertex at (3, -6) and passes through the point (-4, 2). Show work for full credit. Write your final answer in **<u>standard form.</u>**

5. A chain-store manager has been told by the main office that daily profit, P, is related to the number of clerks working that day, x, according to the equation $P = -25x^2 + 300x$. What number of clerks will maximize the profit, and what is the maximum possible profit?

6. For a bottle rocket, the height, h, in meters, as a function of time t, in seconds, is given by $h = -4.9t^2 + 38t$. How long does it take for the bottle rocket to hit the ground?

7. The profit P, in dollars, gained by selling x handbags is modeled by the equation $P = -2x^2 + 600$. How many handbags must be sold to obtain a profit of $550?

8. A ball is thrown upward from ground level. Its height h, in feet, above the ground after t seconds is $h = 48t - 16t^2$. Find the maximum height of the ball.

9. The profit P, in dollars, gained by selling x computers is modeled by the equation $P = -5x^2 + 100x + 5000$. How many computers must be sold to obtain a profit of $55,000.00?

10. Suppose a ball is thrown directly upward from an initial height of 200 feet with an initial velocity of 96 feet per second. The function $h = -16t^2 + 96t + 200$ models the throw. After how many seconds will the ball reach a height of 300 feet?

11. We throw an object upward from the top of a 1200 ft tall building (measured in feet). The height of the object t seconds after we threw it is $h = -16t^2 + 160t + 1200$. How long does it take for the object to hit the ground?

12. The equation for the cost in dollars of producing automobile tires is $C = .000015x^2 - 0.03x + 35$, where x is the number of tires produced. Find the number of tires that minimizes the cost. What is the cost for that number of tires?