Name:_____          Date:_____
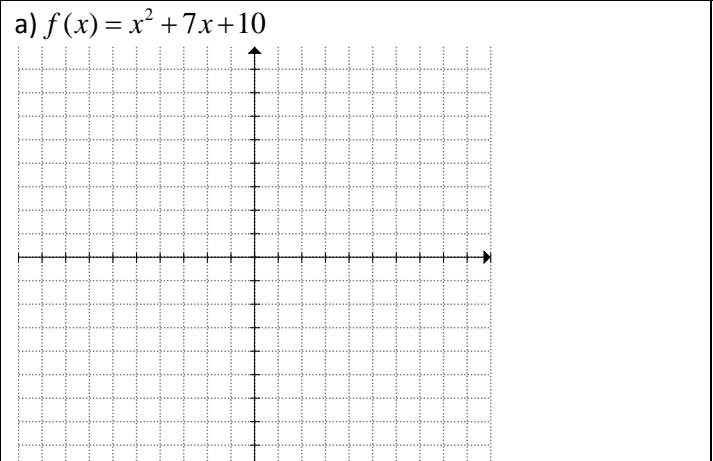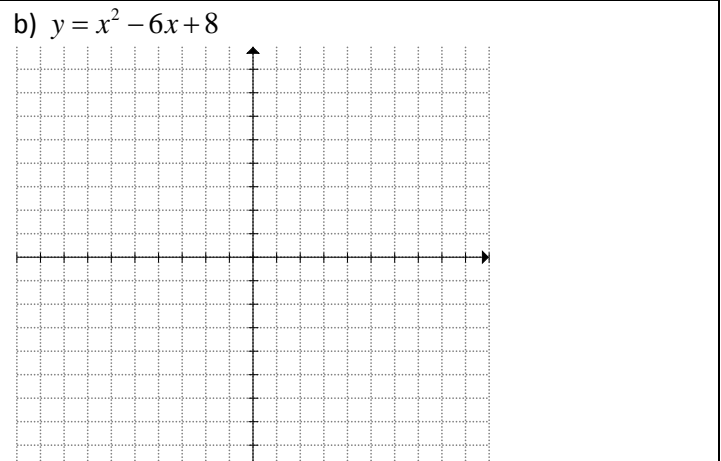
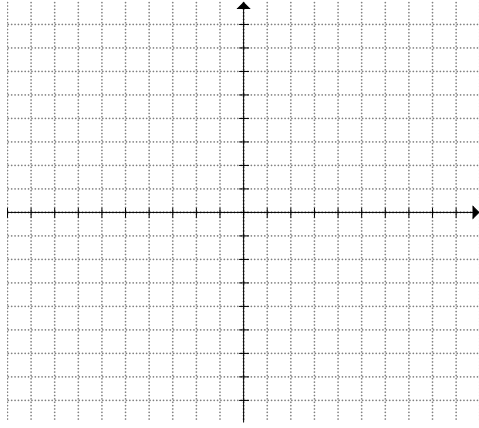### Pre Calculus 11 HW: Section 3.2 Quadratic Functions $y = ax^2 + bx + c$

1. For each of the following quadratic functions find the coefficients "a,b,c" and then find i) the Coordinates of the Vertex and the iii) Domain and Range

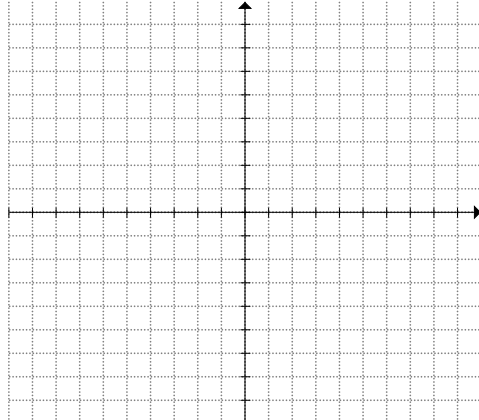| | |
|---|---|
| a) $y = x^2 + 3x - 18$<br><br>$a =$          $b =$          $c =$<br><br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ | b) $y = 2x^2 - x - 2$<br><br>$a =$          $b =$          $c =$<br><br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ |
| c) $y = -x^2 - 12x - 35$<br><br>$a =$          $b =$          $c =$<br><br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ | d) $y = 6x^2 + 13x - 5$<br><br>$a =$          $b =$          $c =$<br><br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ |
| e) $y = 2x(x-4)$<br><br><br>$a =$          $b =$          $c =$<br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ | f) $y = (2x-1)(3x+4)$<br><br><br>$a =$          $b =$          $c =$<br><br><br><br>$Vertex:$<br>$Domain:$          $Range:$ |

2. Find the coordinates of the vertex and then graph it on the grid provided. Label the vertex, axis of symmetry, y-intercept on the graph.

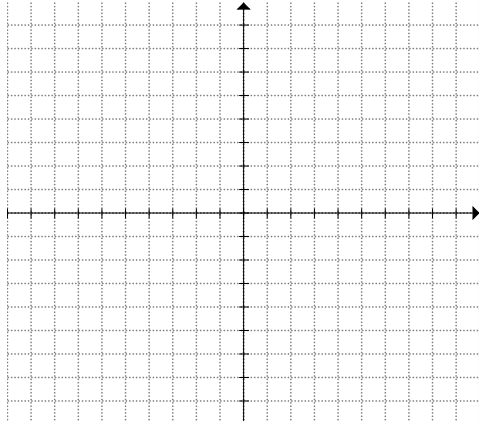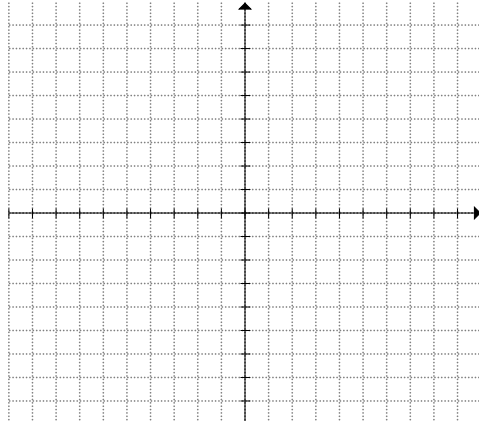| | |
|---|---|
| a) $f(x) = x^2 + 7x + 10$ | b) $y = x^2 - 6x + 8$ |

c) $y = x^2 + 4x + 8$

d) $y = 2x^2 + 16x + 26$

e) $y = -x^2 - 4x - 3$

f) $y = -3x^2 - 18x - 25$

3. A pebble is thrown from a bridge into a river at height "h" meters above the river. Let "t" be the number of seconds after the release. If the height of the pebble is given by the equation: $h(t) = -4.9t^2 + 10t + 65$, then:

a) How high is the pebble after 3 seconds?

b) What is the vertex of the equation? What does the vertex represent?

c) What is the domain and range of this scenario and what does it represent?

d) What is the y-intercept and what does it represent?

4. Tom throws a football from the top of his building.  The height of the ball is given by the formula:
$h(t) = -3t^2 + 60t + 132$, where "h" is the height of the football and "t" is the number of seconds after the throw.

a) Draw a graph for this scenario and then find the vertex of this equation?   Show your work algebraically
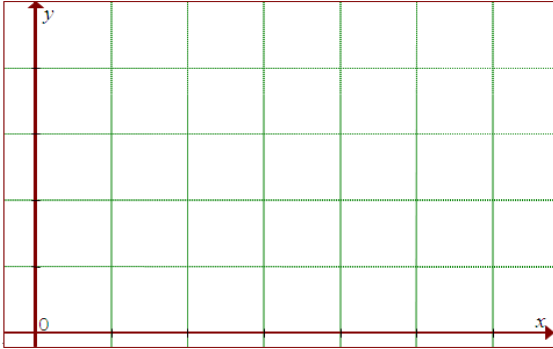


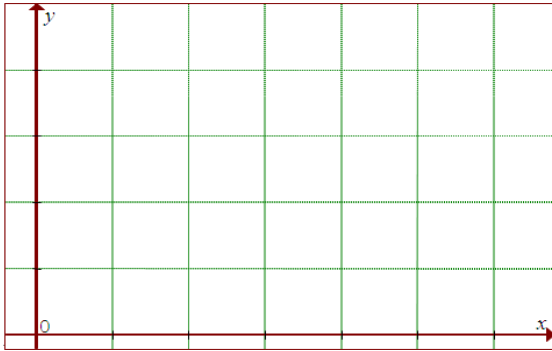b) What is the domain and range of this scenario?  Explain it in the context of this question:

c) When will the ball be falling to 150m?

5. Suppose you have 100 m of fencing that will be used to build a rectangular fence around your house
   a) Write a quadratic function in standard form to represent the area of the rectangular lot

   b) What are the coordinates of the vertex?  What does the coordinate represent?

c) Sketch the graph of the function



d) Determine the domain and range:

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6. If the quadratic equation $(x-2)^2 + k = 0$ has two distinct real roots, then what is the range of "k"?

(Multiple choice, cirlce one) Justiy your answer.

a) $k > 2$        b) $k < 0$        c) $k \leq 0$        d) $k \leq 4$

7. Point "A" is the vertex of the parabola $y = x^2 + 2$, point "B" is the vertex of the parabola $y = x^2 - 6x + 7$, and "O" is the origin. Determine the area of $\triangle AOB$.