

1. Find the y-intercept and the axis of symmetry for:  $f(x) = -2x^2 + 2x + 2$
  
  
  
  
  
  
  
  
  
  
2. Graph each of the following. Use the vertex, y-intercept & symmetric point, and x-intercepts (if necessary estimate to the nearest  $10^{\text{th}}$ ). I've attached four graphs for your use.
  - a)  $f(x) = -2x^2 + 2x + 2$
  - b)  $f(x) = x^2 - 2x + 2$
  
  - c)  $f(x) = -x^2 + 2x + 7$
  - d)  $f(x) = x^2 - 2x + 7$
  
  
  
  
  
  
  
  
  
  
3. Solve by factoring.
  - a)  $x^2 + 3x - 28 = 0$
  - b)  $2x^2 + 3x - 14 = 0$
  
  
  
  
  
  
  
  
  
  
6. Solve using the square root property
  - a)  $16x^2 - 48x + 36 = 49$
  - b)  $100x^2 - 80x + 16 = 9$

7. Solve by completing the square.

a)  $x^2 + 2x - 3 = 0$

b)  $2x^2 + 2x = 0$

8. Give the value of the discriminant and then give the number and type of solutions.

a)  $-x^2 - 14x + 2 = 0$

b)  $x^2 + x + 7 = 0$

9. Write in vertex form (hint: complete the square) and give the vertex. We will probably need to go over this, but for pre-calculus and for calculus it is essential you know how to complete a square.

a)  $y = x^2 + 4x - 6$

b)  $y = -3x^2 + 48x$

10. Use vertex form to write an equation for the parabola whose vertex is (2, 6) and which passes through (4, -1).

11. Use vertex form to write an equation for the parabola whose vertex is (3, 3) and which passes through (5, 27).

12. The height of a pebble dropped from a 604 foot high cliff is described by the formula  $h(t) = -16t^2 + 604$ . How long will it take for the pebble to reach a height of 348 feet?
13. The revenue  $p$  of a company is described by  $p(x) = 20000 + 5x^2$ , where  $x$  is the number of units sold. How many units would be produced, causing the company's revenue to be at a minimum?
14. A rectangular frame has length  $(x + 2)$  units and width  $(x - 4)$  units. If the area is 7 square units, what is the value of  $x$ ?
15. The shape of a window is a parabola that can be modeled with the equation  $h(w) = -2w^2 + 12$ , where  $h(w)$  is the height of the window and  $w$  is the width in feet. What width will maximize the height of the window?