

## Parabolas Day 2 Notes

Given the following description write the equation of the graph:

1. A parabola that has gone up 3 and left 7

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

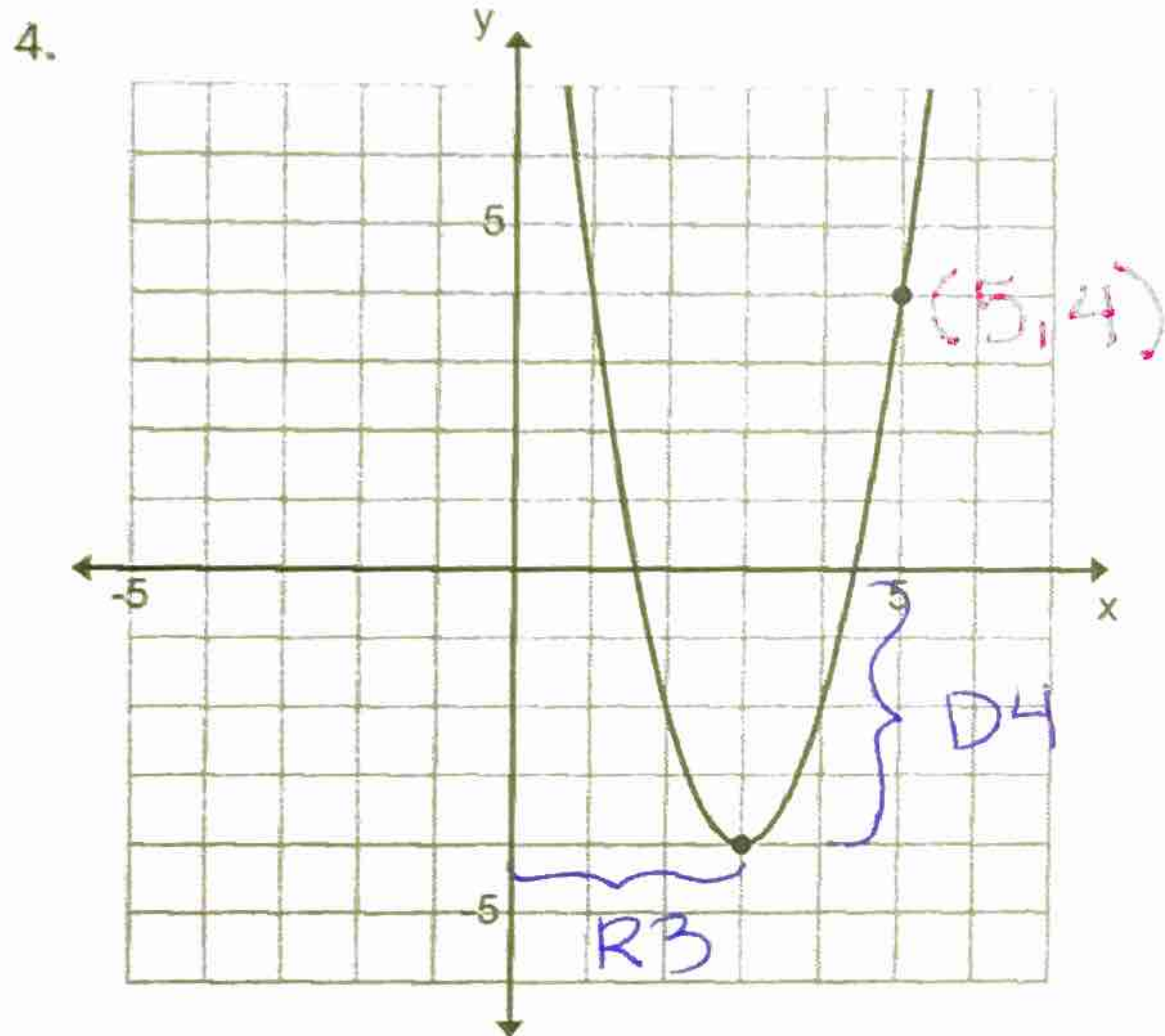
2. A quadratic that has been vertically dilated by  $\frac{1}{2}$  and up 10

$$y = \frac{1}{2}(x)^2 + 10$$

3. A parabola that has been moved right 8, down 5 and reflected over the x-axis.

$$y = -(x - 8)^2 - 5$$

Given the following graphs find the equations (make sure to solve for a with algebra!)



① vertex :  $(3, -4)$

$$y = a(x - 3)^2 - 4$$

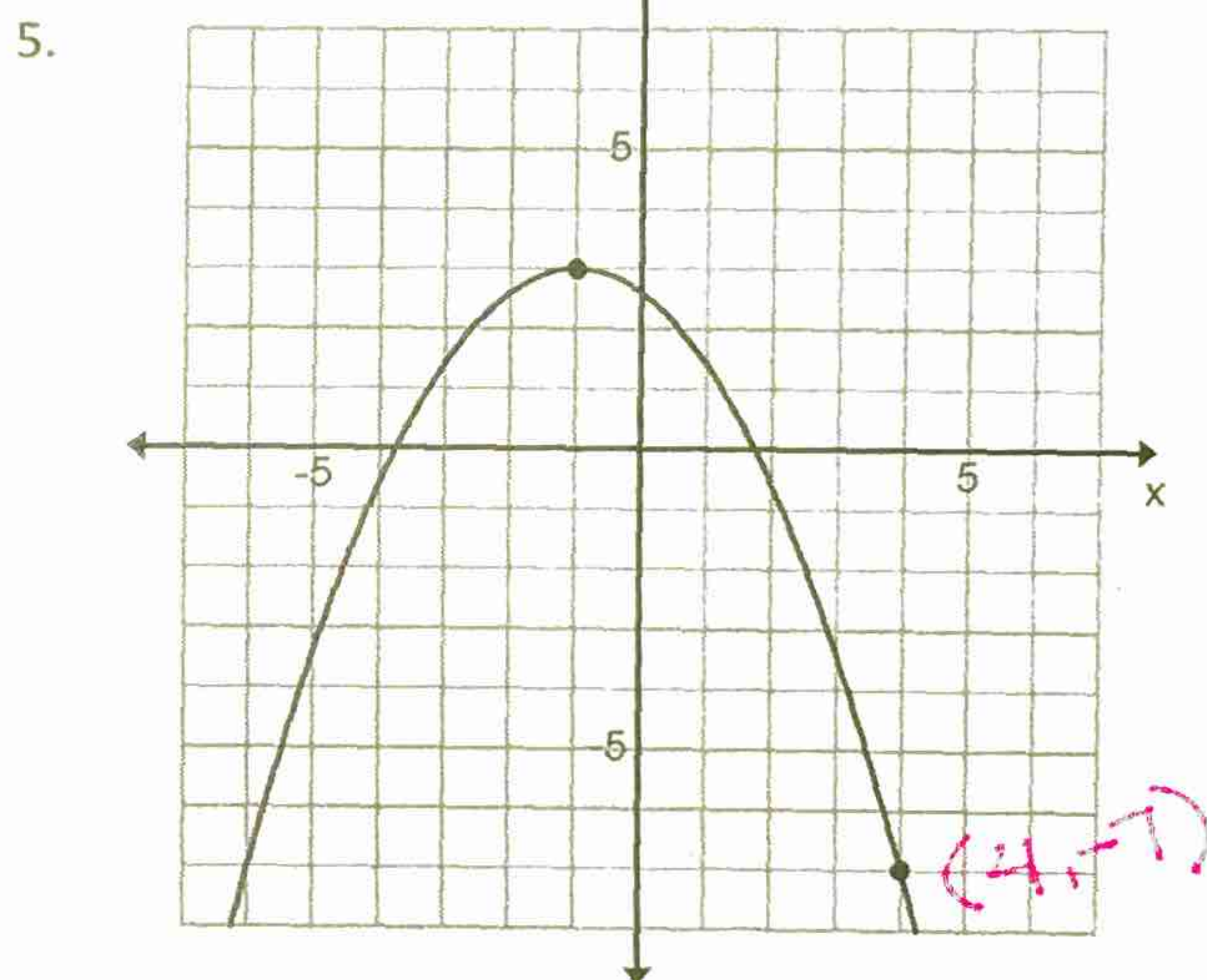
$$4 = a(5 - 3)^2 - 4$$

$$8 = a(2)^2$$

$$8 = 4a$$

$$2 = a$$

$$\boxed{y = 2(x - 3)^2 - 4}$$
 ③ final answer



vertex :  $(-1, 3)$   $\frac{L1}{U3}$

$$y = a(x + 1)^2 + 3$$

$$-7 = a(4 + 1)^2 + 3$$

$$-10 = 25a$$

$$\frac{-10}{25} = a$$

$$-\frac{2}{5} = a$$

$$\boxed{y = -\frac{2}{5}(x + 1)^2 + 3}$$



6. Now write the equations from #4 & #5 in standard form  $y = ax^2 + bx + c$

$$\textcircled{\#4} \quad y = 2(x-3)^2 - 4$$

$$y = 2(x-3)(x-3) - 4$$

$$y = 2(x^2 - 3x - 3x + 9) - 4$$

$$y = 2x^2 - 6x - 6x + 18 - 4$$

$$\boxed{y = 2x^2 - 12x + 14}$$

$$\textcircled{\#5} \quad y = -2/5(x+1)^2 + 3$$

$$y = -2/5(x+1)(x+1) + 3$$

$$y = -2/5(x^2 + x + x + 1) + 3$$

$$y = -2/5x^2 - 2/5x - 2/5x - 2/5 + 3$$

$$\boxed{y = -2/5x^2 - 4/5x + 13/5}$$

$$-.4 \quad -.8 \quad 2.6$$

7. Nick is starting a bakery and is trying to figure out how to maximize his profit based on selling pecan pies. He found his profit equation was  $y = -4x^2 + 152x + 20$ .

A. How many pies should he make each day to maximize his profit?

$$x = -152 / 2(-4)$$

$$x = 19 \text{ pies}$$

B. How much profit can he make each day?

$$y = -4(19)^2 + 152(19) + 20$$

$$y = \$1,404$$

vertex

$$x = -b/2a$$

y = plug in x