

24.

$$a^2 + b^2 = c^2$$

$$x^2 + (400-x)^2 = (300)^2$$

$$\underline{x^2 + 160,000 - 800x + x^2 = 90,000}$$

$$1 \quad \frac{2x^2}{2} - \frac{800x}{2} + \frac{70,000}{2} = \frac{0}{2}$$

$$x^2 - 400x + 35,000 = 0$$

$$x = \frac{-(-400) \pm \sqrt{(-400)^2 - 4(1)(35,000)}}{2(1)}$$

$$= \frac{400 \pm \sqrt{160,000 - 140,000}}{2}$$

$$= \frac{400 \pm \sqrt{20,000}}{2}$$

$$= \frac{400 \pm 141.42}{2}$$

$$= \frac{400 + 141.42}{2} \quad \text{or} \quad \frac{400 - 141.42}{2}$$

$$= \boxed{270.71 \text{ ft}} \quad \boxed{129.29 \text{ ft}}$$

36.

$$h = 5 + 25t - 16t^2$$

$$4 = 5 + 25t - 16t^2$$

$$\begin{array}{r} -4 \quad -4 \\ \hline \end{array}$$

$$0 = 1 + 25t - 16t^2$$

$$X = \frac{-25 \pm \sqrt{(25)^2 - 4(1)(-16)}}{2(-16)}$$

$$= \frac{-25 \pm \sqrt{625 + 64}}{-32}$$

$$= \frac{-25 \pm \sqrt{689}}{-32}$$

$$= \frac{-25 \pm 26.25}{-32}$$


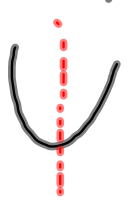
$$= \frac{-25 + 26.25}{-32}$$

$$= -.06$$

$$\frac{-25 - 26.25}{-32}$$

$$2.81 \text{ sec}$$

6.5 Graphs of Quadratics

- The graph of $f(x) = ax^2 + bx + c$ is a parabola. If we complete the square, standard form is $f(x) = a(x-h)^2 + k$.
- The vertex, the highest or lowest point, is (h, k) 
- The vertical line $x=h$, is the axis of symmetry 

Write $f(x) = x^2 - 6x + 5$ in standard form. Find the vertex and axis of symmetry.

$$f(x) = x^2 - 6x + 5$$

$$\underline{0 = x^2 - 6x + 5}$$

$$9 \rightarrow -5 = x^2 - 6x + 9$$

$$-6 \div 2 = (-3)^2 = 9$$

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

$$-4$$

$$0 = (x - 3)^2 - 4$$

$$f(x) = (x - 3)^2 - 4$$

vertex: $(h, k) \rightarrow (3, -4)$

axis of symmetry: $x = 3$

Vertex Formula : for $f(x) = ax^2 + bx + c$,
the vertex is $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

Find the vertex and axis
of symmetry of $f(x) = -x^2 - 4x - 3$

$$\frac{-b}{2a} = \frac{-(-4)}{2(-1)} = \frac{4}{-2} = -2$$

$$f(x) = -(-2)^2 - 4(-2) - 3$$

$$f(x) = 1$$

$$\text{vertex: } (-2, 1)$$

$$\text{axis of sym: } x = -2$$

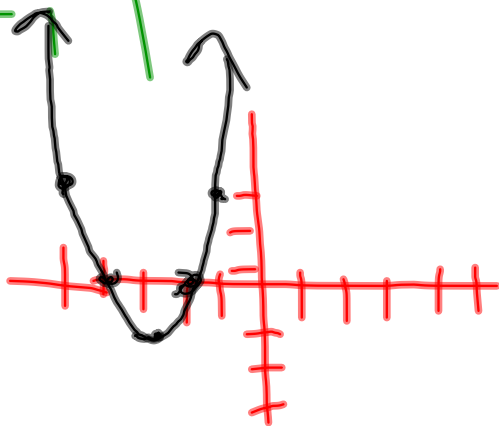
Sketching a parabola

1. Find the vertex
2. make a table of values (symmetry)
3. plot your points.

Ex: Sketch $y = x^2 + 6x + 8$

$$\frac{-b}{2a} = \frac{-6}{2(1)} = -3$$

x	process	y
-5	$(-5)^2 + 6(-5) + 8$	3
-4	$(-4)^2 + 6(-4) + 8$	0
-3	$(-3)^2 + 6(-3) + 8$	-1
-2		0
		3



P. 408
4-56

mult. of 4.
all evens extra credit