Sec 9.5 11/9/12 Math 1010

~~#24~~

#24
#30
#44

#24 $S(6S - t) = t^2$ for S

$6S^2 - tS - t^2 = 0$ $\quad -6t^2 \mid -t$

$6S^2 - 3tS + 2tS - t^2 = 0$ $\quad -3t, +2t \mid -t$ ✓

$3S(2S - t) + t(2S - t)$

$(2S - t)(3S + t) = 0$

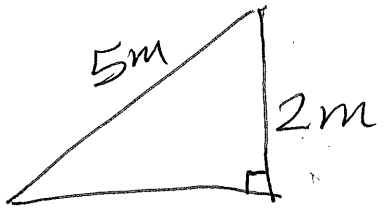
$2S - t = 0$ $\quad 3S + t = 0$

$+t \quad +t$ $\quad -t \quad -t$

$\frac{2S}{2} = \frac{t}{2}$ $\quad \frac{3S}{3} = -\frac{t}{3}$

$S = \frac{t}{2}, -\frac{t}{3}$

#30



$(2m+3)^2 + (2m)^2 = (5m)^2$

$(2m+3)(2m+3)$

$4m^2 + 6m + 6m + 9 + 4m^2 = 25m^2$

$8m^2 + 12m + 9 = 25m^2$

$-25m^2 \quad -25m^2$

$-17m^2 + 12m + 9 = 0$

$a = -17 \quad b = 12 \quad c = 9$

$m = \frac{-12 \pm \sqrt{144 - 4(-17)(9)}}{2(-17)} = \frac{-12 \pm \sqrt{144 + 612}}{-34}$

$= \frac{-12 \pm \sqrt{756}}{-34}$

$m = \frac{(-12 - \sqrt{756})}{-34}$ $\quad m = \frac{(-12 + \sqrt{756})}{-34}$

$m = 1.1616$ $\quad$ ~~$m = 0.4557$~~

$2m = 2.3232 \approx 2.3$

$2m+3 = 5.3232 \approx 5.3$

$5m = 5.808 \approx 5.8$

$5(1.1616)$

$S(t) = 144t - 16t^2$ t is time in seconds

$S(t)$: distance above ground in ft

#44 $t = ?$ $S(t) = 0$

$0 = 144t - 16t^2$

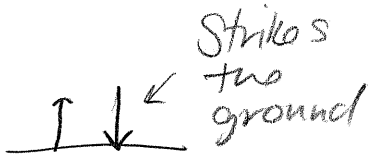
$0 = 16t(9 - t)$

$16t = 0$ $\quad 9 - t = 0$

$t = 0$ $\quad +t \quad +t$

$9 = t$

$t = 9$ sec



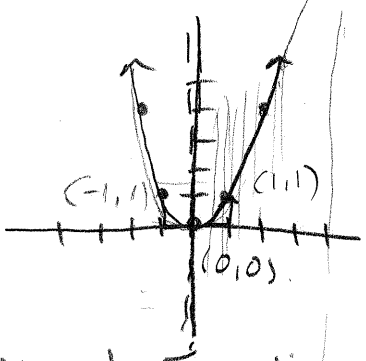
Sec 9.5 Graphs of Quadratic Functions

Quadratic Function: $f(x) = ax^2 + bx + c$

Every Quadratic Function's graphs is a parabola

Ex: $y = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4



"Parent Function"

Points of Interest

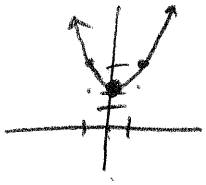
Vertex: (0,0)

axis of symmetry $x = 0$

Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

$y = x^2 + 2$ ← went ↑ 2 units



$y = x^2 - 3$ ← went ↓ 3 units

$y = x^2 + k$ ← moves up/down k units

Ex: $y = (x+2)^2$ ← moved left 2 units

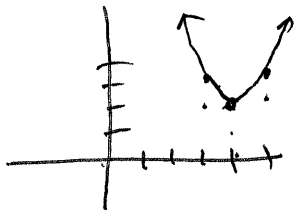
$y = (x-3)^2$ ← moved Right 3 units

$y = (x-h)^2$ ← move left/right h units

Remember direction is opposite of sign.

Ex: $y = (x-4)^2 + 2$

→ 4 ↑ 2



for $f(x) = (x-h)^2 + k$

Vertex: (h, k)

axis of symmetry

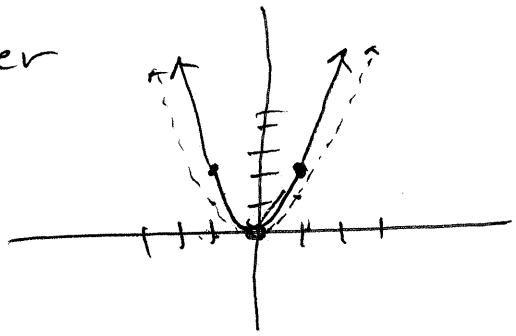
$x = h$

Same shape as $y = x^2$

Let's Look at

$y = 2x^2$ ← Narrower

x	y
-1	$2(-1)^2 = 2 \cdot 1 = 2$
0	$2(0)^2 = 2 \cdot 0 = 0$
1	$2(1)^2 = 2 \cdot 1 = 2$



$y = \frac{1}{2}x^2$ ← wider

Generalization

$y = ax^2$ if $a > 1$ Narrower parabola

$0 < a < 1$ wider parabola

a is Negative?

$y = -x^2$ ← flips my parabola