



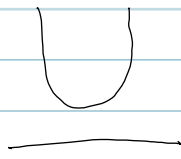
11/12/2012 NOTES CONT.

# \* DISCRIMINANT

$D > 0 (+)$   $\frac{\# \pm \#}{\#}$  2 real solns 

$D = 0$   $\frac{\# \pm \sqrt{0}}{\#}$  1 real soln 

$D < 0 (-)$   $\frac{\# \pm \sqrt{-\#}}{\#}$  2 imaginary solns  
(parabola doesn't cross)



"General"  
 $y = ax^2 + bx + c$   
\* not readable \*  
 $h = \frac{-b}{2a}$   
K = plug in h

"Standard"  
 $y = a(x-h)^2 + k$   
\* readable \*  
(h, k)

[a] sign  $a > 0 (+)$  up  $\cup$   
 $a < 0 (-)$  down  $\cap$   
size ( $|a|$ )

[x-int]  $y = 0$   
 $D = ax^2 + bx + c$

Formula  $x = h \pm \sqrt{\frac{-k}{a}}$

\* (h, k) version of quadratic formula


$0 < |a| < 1$  } compressed (wide) fraction

$|a| = 1$  neutral

$|a| > 1$  stretched (narrow)

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8.5/8.6 CONT

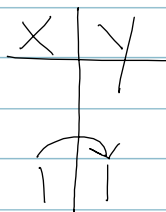
**Ex**  $y = 2x^2 + 4x - 1$  shape:  (neg. coefficient)  
 $a = -2$   $b = 4$   $c = -1$   $(h, k) \Rightarrow$  not readable

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

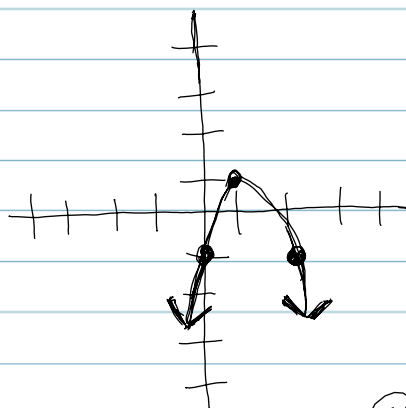
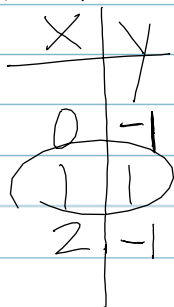
$-2(1)^2 + 4(1)(-1)$   $h, k = (1, 1)$

$-2 + 4 - 1 = 1$

**a**  $a = -2$   $-$  down  
 $2$  stretched (narrow)



GRAPH:



$D: (-\infty, \infty)$   $\text{TR}$   
 $R: (-\infty, 1]$

**X-int**  $y = 0$

$0 = -2x^2 + 4x - 1$

$(h, k)$  VERSION OF QUAD. FORMULA

$x = h \pm \sqrt{\frac{-k}{a}}$   $(h, k) = (1, 1)$   
 $a = -2$

$x = 1 \pm \sqrt{\frac{-1}{-2}}$

$x = 1 \pm \sqrt{\frac{1}{2}}$

$1 + \sqrt{\frac{1}{2}}, 1 - \sqrt{\frac{1}{2}}$

$1.707, 0.292$

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Ex  $y = \frac{1}{2}(x-4)^2 - 6$

Shape =  $\cup$   
Vertex = readable  
(4, -6)

$a = \frac{1}{2}$  + up  
 $\frac{1}{2}$  compressed (wide)

| x | y               |
|---|-----------------|
| 0 | 2               |
| 3 | $-5\frac{1}{2}$ |
| 4 | -6              |
| 5 | $-5\frac{1}{2}$ |
| 8 | 2               |

X-int

$y=0$

$x = h \pm \sqrt{\frac{k}{a}}$

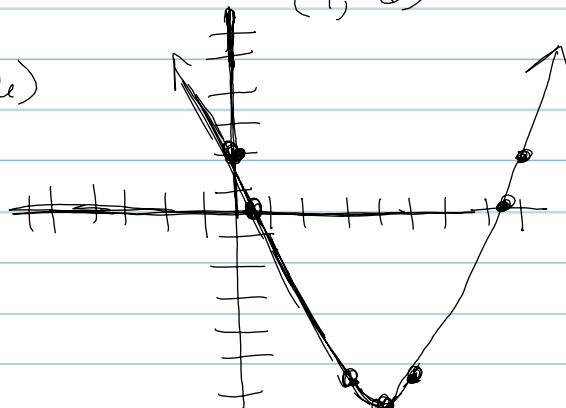
$(h, k) = (4, -6)$

$a = \frac{1}{2}$

$x = 4 \pm \sqrt{\frac{6}{\frac{1}{2}}}$

$x = 4 \pm \sqrt{12}$   
 $4 + \sqrt{12} \quad 4 - \sqrt{12}$

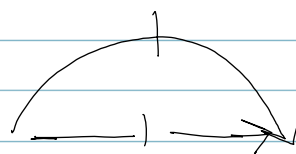
7.46    .53



$D = \mathbb{R}$

$R = [-6, \infty)$

\* WORD PROBLEMS \*

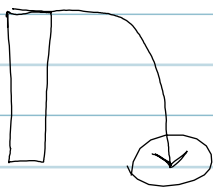


$a > 0 (+)$   $\cup$  min

$a < 0 (-)$   $\cap$  max

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\* WORD PROBLEMS \*

EX. # 88 sec. 8.6



FORMULA

$$f(x) = 0.072x^2 + 1.93x + 173.9$$

year  
2000  $x=0$

2001  $x=1$


2002  $x=2$

a) In 2018?

let  $x=18$

$$f(18) = 0.072(18)^2 + 1.93(18) + 173.9$$

use calculator = 185.3

b)  min/max  
 $a = -\#$

c) max = vertex

$$h = \frac{-b}{2a}$$

$$= \frac{-1.93}{2(0.072)} = 13.4$$

year  
2013

$x$  = when or where

$y$  = how or why

$$(y) K = -0.072(13.4)^2 + 1.93(13.4) + 173.9$$

=

the emissions