$\boxed{\text{BE - Alg. 2}}$ WEDNESDAY 3-9-11

① Solve $-2x^2+8x-5=0$

By completing the square.
(EXACT ANSWER)

$-2x^2+8x-5=0$

$\frac{-2x^2}{-2}\ \frac{+8x}{-2} = \frac{5}{-2}$

$x^2-4x+2^2 = -\frac{5}{2} + 4$

$\left(\frac{8}{2}\right)$ ''

$(x-2)^2 = \frac{3}{2}$

$x-2 = \pm\sqrt{\frac{3}{2}}$

$\boxed{x = 2\pm\sqrt{\frac{3}{2}}} = 2\pm\frac{\sqrt{3}}{\sqrt{2}} = 2\pm\frac{\sqrt{6}}{2}$

EXACT

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

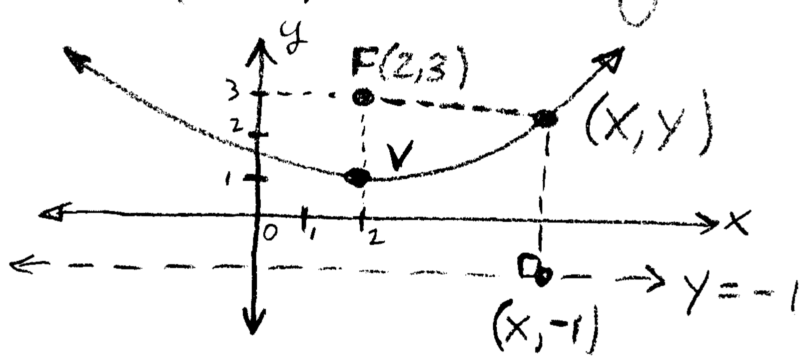
$=\boxed{\frac{4\pm\sqrt{6}}{2}}$

SIMPLIFIED

Ch 8-2 Parabolas

Ex - Pg. 419 ⇒ Using the distance formula to find the equation of a parabola, if you know the coordinates (x, y) of the focus and the equation of the directrix ⇒ horizontal line, $y = \text{constant}$

Given: Focus $(2, 3)$, directrix $y = -1$



(X, Y) is any point on the line.

By definition of parabola:

distance from $F(2,3)$ to (x, y) = distance from (x, y) to $(x, -1)$

$$\sqrt{(x-2)^2 + (y-3)^2} = \sqrt{(x-x)^2 + (y-(-1))^2}$$ Square both sides

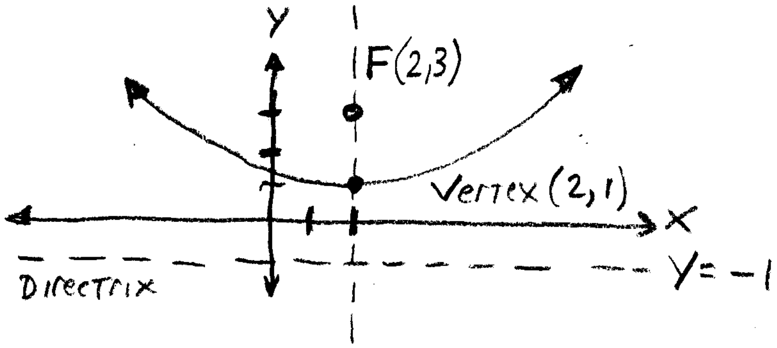
$$(x-2)^2 + (y-3)^2 = 0^2 + (y+1)^2$$ Get "y" by itself

$$(x-2)^2 + (y^2 - 6y + 9) = y^2 + 2y + 1$$

$$-y^2 + 6y - 1 \qquad -y^2 + 6y - 1$$

$$\frac{(x-2)^2}{8} + \frac{8}{8} = \frac{8y}{8}$$

$$\boxed{\frac{1}{8}(x-2)^2 + 1 = y}$$ Vertex, $V(2, 1)$ x, y



AOS $x = 2$ since $F(2,3)$

$x = 2$

h = horizontal shift !!
k = vertical shift !!

$$\boxed{y = \frac{1}{8}(x-2)^2 + 1}$$ $V(2,1)$

$$\boxed{y = a(x-h)^2 + k}$$

book → "STANDARD" Form of Equation of a parabola.
(I call this h, k form)

OTHER BOOKS → "Vertex Form"

$V(h,k)$
AOS $x = h$
$a = +$
$a = -$

Any parabola in the $ax^2 + bx + c = y$ form can be written in h, k form.

EX1 pg420 WRITE $y = 3x^2 + 24x + 50$ in h, k form
⇒ First factor GCF

$$y = 3(x^2 + 8x) + 50$$

complete the square

$$y = 3\left[x^2 + 8x + 4^2\right] + 50 - (3 \cdot 16)$$

WHY ⊖? WHY $3 \cdot 16$?

$$\boxed{y = 3\left[x + 4\right]^2 + 2}$$ $V(-4,2)$

AOS ⇒ $x = -4$

$$y = a(x-h)^2 + k$$

Summary of 2 forms of a parabola:

STANDARD FORM

$$ax^2+bx+c=y \qquad V\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$$

$$x=\frac{-b}{2a}=AOS$$

$+a$ $-a$

CTS

CAN SWITCH BETWEEN

DP + FOIL

VERTEX FORM

$$y=a(x-h)^2+k \qquad V(h,k)$$

$$x=h=AOS$$

$+a$ $-a$

Ex 2b Pg 421 GRAPH $y=-2(x-2)^2+3$

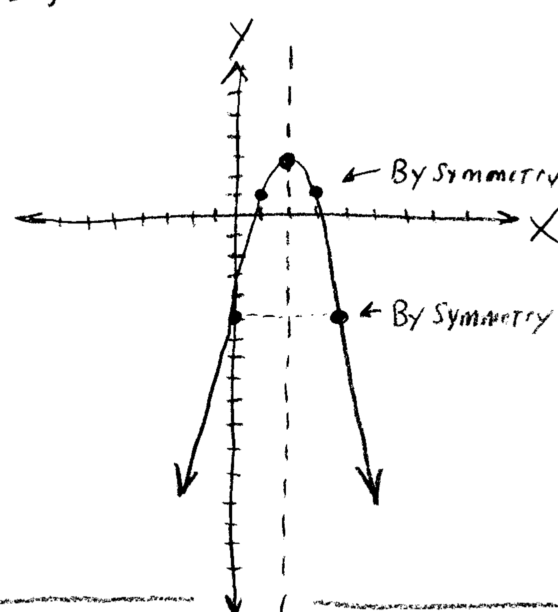
$\Rightarrow$

$\Rightarrow$ AOS $\Rightarrow x=2$

$\Rightarrow V(2,3)$

$\Rightarrow$ "Smart T-table"

X	Y
0	-5
1	1



BE $\Rightarrow 2\pm\sqrt{\frac{3}{2}} \cong 2\pm 1.22 \Rightarrow \{3.22, 0.78\}$ = X INTERCEPTS ✓

Put $y = -2(x-2)^2 + 3$ into standard form & then graph it.

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

$$y = -2[x^2 - 4x + 4] + 3$$

$$y = -2x^2 + 8x - 8 + 3$$

$$y = -2x^2 + 8x - 5$$

AOS $\Rightarrow x = \frac{-b}{2a}$

$x = \frac{-8}{2(-2)} = 2$

$a = -2 \Rightarrow$

	x	y
V	2	$-2(2)^2 + 8(2) - 5$ $-8 + 16 - 5 = 3$
	0	-5
	1	1

$\Rightarrow$ Same as $y = -2(x-2)^2 + 3$ graph

Homework: Graph the following parabolas:
Pg 423 # 1, 4, 6