

12/10

Topic 2 reteach notes

Standard Form

$$y = ax^2 + bx + c$$

↑
y-intercept

Vertex form

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

(h, k) is vertex
h is AOS

Standard Form

$$y = a(x-p)(x-q)$$

p and q are x-intercepts
Axis of symmetry is halfway
between p and q

To convert from standard to factored:

ex. factor $y = x^2 + 3x - 10 \rightarrow$ so, x-intercepts: (-5, 0) (2, 0)
y-intercept: (0, -10)

$$= (x+5)(x-2)$$

To convert from standard to vertex:

ex: complete the square

$$y = x^2 + 6x + 1$$
$$= x^2 + 6x + \boxed{9} + 1 + \boxed{-9}$$

↑
 $(\frac{b}{2})^2$

$$y = (x+3)^2 - 8 \rightarrow$$
 so, vertex: (-3, -8)
y-intercept: (0, 1)

To convert from factored or vertex to standard:

$$y = (x+2)(x-4)$$
$$x^2 - 4x + 2x - 8 \rightarrow y = x^2 - 2x - 8$$

Topic 2 cont.

continued:

$$\begin{aligned}
 y &= (x-1)^2 + 3 \\
 &= (x-1)(x-1) + 3 \\
 &\quad x^2 - x - x + 1 + 3 \\
 y &= x^2 - 2x + 4
 \end{aligned}$$

Writing an equation from a table:

x	y		
-3	-2	> -6	
-2	-8	> -2	> +4
-1	-10	> +2	> +4
0	-8	> +6	> +4
1	-2	> +16	> +4
2	8	> +14	> +4
3	22		

vertex ↙

reminder: a is half of the 2nd difference!

so $a = \frac{4}{2} = 2$

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

$$y = 2(x+1)^2 - 10$$

To graph in factored form:

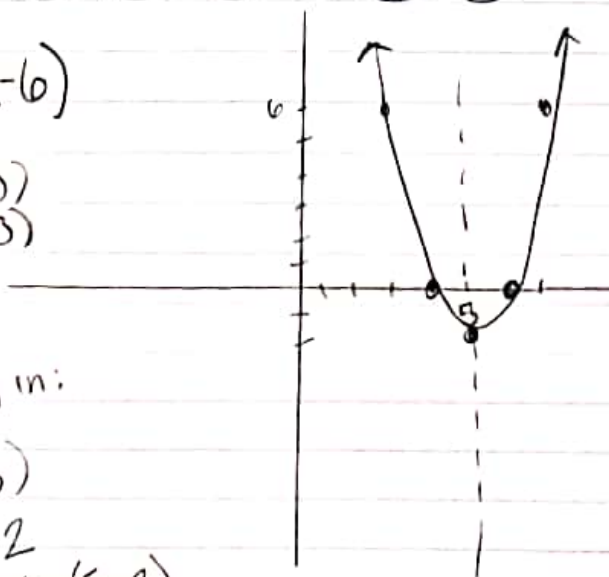
$$y = 2(x-4)(x-6)$$

x-intercepts: (4,0)
(6,0)

AOS: 5

↙ plug in:

$$\begin{aligned}
 &2(5-4)(5-6) \\
 &= 2(1)(-1) = -2 \\
 &\text{so vertex: } (5, -2)
 \end{aligned}$$



Find 1 more point:
(3, 6)

$$\begin{aligned}
 &2(3-4)(3-6) \\
 &2(-1)(-3)
 \end{aligned}$$

To graph in vertex form:

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

① Start with vertex: $(-3, -2)$

② use "a" like a slope
(up a, over 1)

③ find another point
by choosing an x and
plugging it in.

$$(-1, 0)$$

$$.5(-1+3)^2 - 2$$

$$.5(2)^2 - 2$$

$$.5(4) - 2$$

$$2 - 2$$

$$= 0$$

