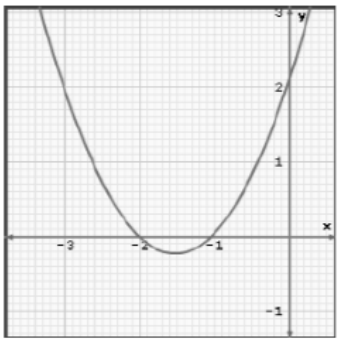
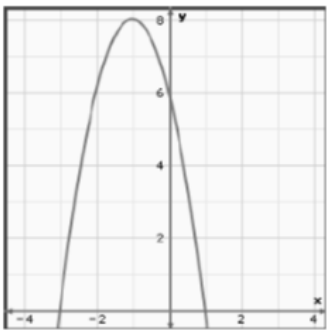
MBF 3C1 Name: _____

Quadratics in Factored Form

State the key features of each graph.

	$y=(x+2)(x+1)$	$y=-2(x+3)(x-1)$
		
zeros	$(-2,0)$ and $(-1,0)$	$(-3,0)$ and $(1,0)$
y-intercept	$(0,2)$	$(0,6)$
vertex	$(-1.5,-0.2)$	$(-1,8)$
axis of symmetry	$x=-1.5$	$x=-1$
optimal value	$y=-0.2$ MIN	$y=8$ MAX

Compare the equation of each graph to it's key features. What information (about the key features of the parabola) can you take from this form of equation?

- An equation in **factored form**, $y=a(x-s)(x-t)$, tells the location of the zeros.
  (The zeros must be removed from the brackets: $x-s=0$ and $x-t=0$)
  $x=s$ $x=t$

Factored Form can be converted to **Standard Form** by expanding.

$y=3(x-2)(x+1)$

$y=3(x^2+1x-2x-2)$

$y=3x^2+3x-6x-6$

$y=3x^2-3x-6$

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Example 1

a. Factor $y = -3x^2 + 24x - 48$ to find the zeros of the relation.

$y = -3(x^2 - 8x + 16)$

$y = -3(x-4)(x-4)$

$x-4=0$ or $x-4=0$

$x=4$ $x=4$

∴ only one zero at $(4,0)$

b. Factor $y = -24x^2 + 6$ to find the zeros of the relation.

$y = -6(4x^2 - 1)$

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

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

$2x=-1$ $2x=1$

$x=-0.5$ $x=0.5$

∴ zeros $(-0.5,0)$ and $(0.5,0)$

c. Factor $y = -4x^2 + 24x$ to find the zeros of the relation.

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

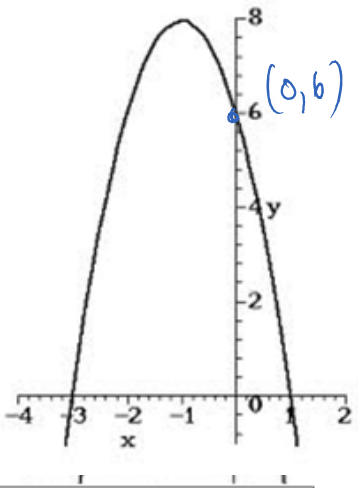
$-4x=0$ $x-6=0$

$x=0$ $x=6$

∴ zeros are $(0,0)$ and $(6,0)$

Example 2

Find the equation of the quadratic in factored form using the picture provided.



1. State the generalization for a quadratic in factored form.	$y = a(x-r)(x-t)$
2. Substitute the zeros into the generalization for *r* and *t*	$y = a(x--3)(x-1)$
3. Substitute the other point that the parabola passes through into the generalization for (*x*, *y*).	$6 = a(0+3)(0-1)$
4. Solve for the variable *a*. OR if you know standard form, use same "a"	$6 = a(-3)$ $\frac{6}{-3} = \frac{-3a}{-3}$ $-2 = a$
5. Sub the values for *a*, *r*, and *t* into the generalization for factored form.	$\therefore y = -2(x+3)(x-1)$