

Quadratic Models Using Factored Form



Quiz #6 (Front Page)

1. For each of the following circle any representations of quadratic relations. (6 marks)

x	y
-2	9
-1	6
0	5
1	6
2	9

Handwritten notes: Blue arrows pointing to y-values 9, 6, 5, 6, 9. A red circle around the y-values 6, 6, 6. A red checkmark below the table.

x	y
-2	9
-1	6
0	3
1	0
2	-3

Handwritten notes: Blue arrows pointing to y-values 9, 6, 3, 0, -3. A green highlight on the y-values 9, 6, 3, 0, -3. The word "Linear" written below. A red checkmark below the table.

x	y
-2	-5
-1	-8
0	-17
1	-32
2	-53

Handwritten notes: Blue arrows pointing to y-values -5, -8, -17, -32, -53. A red circle around the y-values -8, -17, -32, -53. A red checkmark below the table.

$$y = (x-3)(x-8)$$

$$= x^2 - 8x - 3x + 24$$

Handwritten notes: Red circles around the 3 and 8 in the first equation. A blue arrow points to the 2 in the second equation. The word "Quadratic" written below.

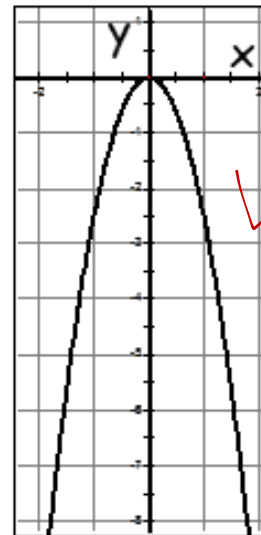
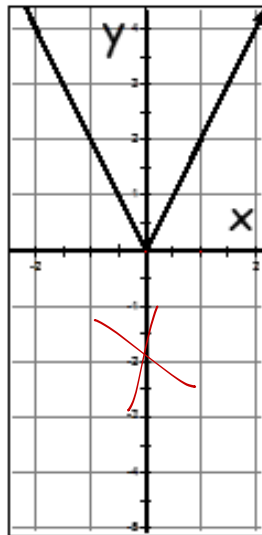
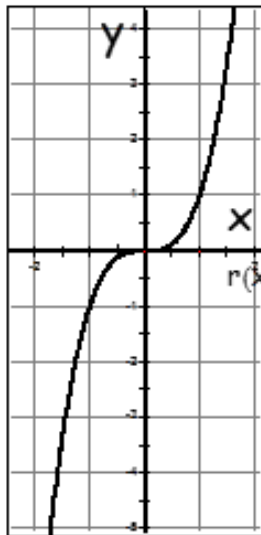
$$y = x(3x-8)$$

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

Handwritten notes: Red circles around the 3 and 8 in the first equation. A blue arrow points to the 3 in the second equation. The word "Quadratic" written below.

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

Handwritten notes: Red circle around the 2 in the first equation. The word "Quadratic" written below.



Quiz #6 (Back Page)

2. Use the graph to state the indicated features. (6 marks)

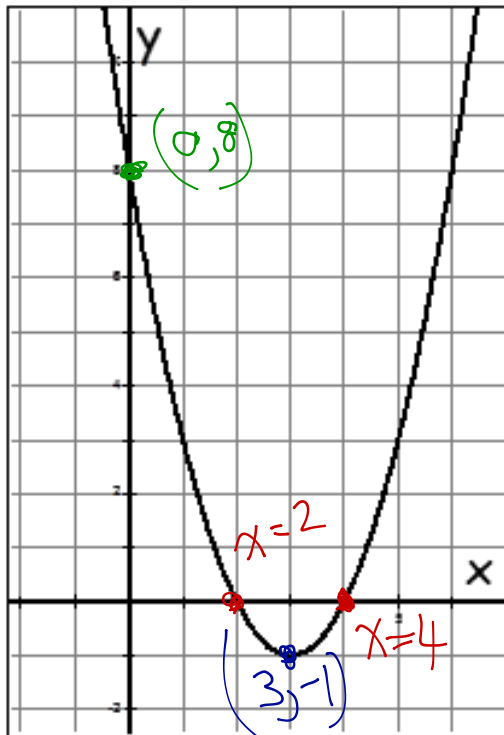
a. The zeros are $x=4$ and $x=2$.

b. The vertex is $(3, -1)$.

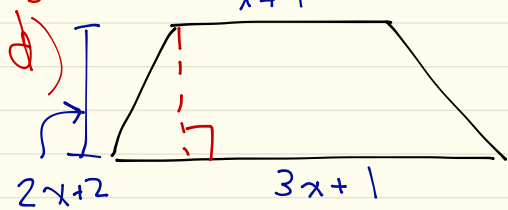
c. The equation of the axis of symmetry is $x=3$.

d. The y-intercept is $y=8$, $(0, 8)$.

e. The direction of opening of this parabola is up.



Pg 167 # 8



$$A = \frac{a+b}{2} h$$

$$A = \frac{(x+1)(3x+1)(2x+2)}{2}$$

$$A = (x+1)(3x+1)(x+1)$$

$$A = (3x^2 + 1x + 3x + 1)(x+1)$$

$$A = (3x^2 + 4x + 1)(x+1)$$

$$A = 3x^3 + 3x^2 + 4x^2 + 4x + 1x + 1$$

$$A = 3x^3 + 7x^2 + 5x + 1$$

Pg 168 #17

$$\cancel{x^3 + 27}$$

a) $(x+3)^3$

$$= (x+3)(x+3)(x+3)$$

$$= (x^2 + 3x + 3x + 9)(x+3)$$

$$= (x^2 + 6x + 9)(x+3)$$

$$= x^3 + 3x^2 + 6x^2 + 18x + 9x + 27$$

$$= x^3 + 9x^2 + 27x + 27$$

Learning Goal

- Determine the equation of a quadratic model using the factored form of a quadratic relation.



Big Ideas

- Steps to write the factored form of the equation of a quadratic relation from a graph:
 - Start with $y = a(x - r)(x - s)$.
 - Replace the “r” and “s” with the zeros of the curve.
 - Find the “a” by substituting a point (x, y) into the equation and solving.



Example

- A parabola passes through the points $(-4, 10)$, $(-3, 0)$, $(-2, -6)$, $(-1, -8)$, $(0, -6)$, $(1, 0)$, and $(2, 10)$. Determine an equation for the parabola in factored form and then express your equation in standard form.

$$x = -3$$
$$x = +1$$

Factored Form

$$\begin{pmatrix} -4, 10 \\ x, y \end{pmatrix}$$

$$y = a(x-r)(x-s)$$

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

$$10 = a(-4+3)(-4-1)$$

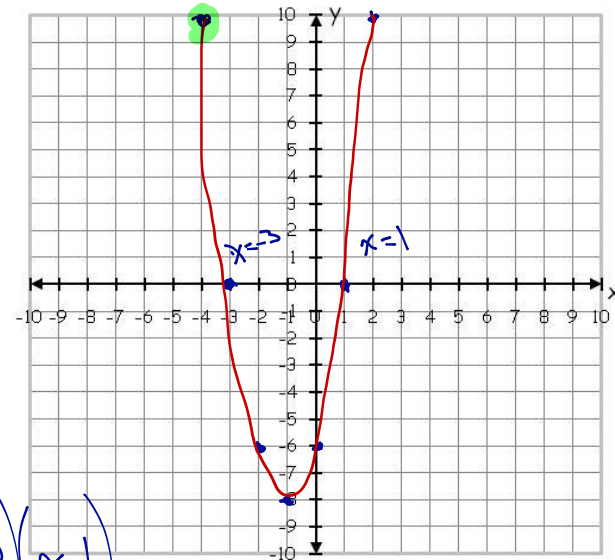
$$10 = a(-1)(-5)$$

$$10 = 5a$$

$$\frac{10}{5} = \frac{5a}{5}$$

$$\boxed{2 = a}$$

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



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

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

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

$$y = 2x^2 + 4x - 6$$

Consolidation

- Will this video work?



Reinforcement

- Pages 176 - 178
 - #6, 9, 11, 13

