

WS - Families of Quadratic Relations

Determine whether the following groups of quadratic relations belong to the same family, and if so, identify the family type (vertex, zeroes, y-intercept).

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

$y = 5(x - 1)^2 - 2$

$y = x^2 - 1x - 6$

2. $y = 4(x - 3)(x - 9)$

$y = 5(x - 6)^2 - 45$

$y = -5x^2 + 60x - 135$

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

$y = 4(x - 1)^2 - 9$

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

4. $y = (x - 5)(x + 1)$

$y = -3(x - 2)^2 - 9$

$y = 2x^2 - 8x - 1$

5. $y = (x - 1)(x + 5)$

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

$y = -3x^2 - 6x - 5$

6. $y = -5(x + 5)(x + 7)$

$y = 3(x + 6)^2 + 5$

$y = 4x^2 + 48x + 149$

7. $y = (x - 4)(x + 2)$

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

$y = 3x^2 + 9x - 8$

8. $y = -2(x + 7)(x - 1)$

$y = -4(x + 3)^2 + 64$

$y = -5x^2 - 30x + 35$

9. Determine the equation (in standard form) for a quadratic relation having zeroes of $2 \pm 2\sqrt{5}$ and passing through the point $P(8, 32)$.
10. Determine an equation for a quadratic with the **same zeroes** as $y = -5x^2 + 100x - 100$, which passes through the point $P(8, 152)$. Express your final answer in standard form.
11. Determine an equation for a quadratic with the **same zeroes** as $y = -2x^2 + 24x - 72$, which passes through the point $P(-3, 243)$. Express your final answer in standard form.
12. Determine the equation (in standard form) for a quadratic relation having zeroes of $3 \pm 4\sqrt{7}$ and passing through the point $P(-6, 31)$.
13. Determine the equation (in standard form) for a quadratic relation having zeroes of $-3 \pm 1\sqrt{5}$ and passing through the point $P(-7, 44)$.
14. Determine an equation for a quadratic with the **same zeroes** as $y = 3x^2 + 18x - 33$, which passes through the point $P(-6, -44)$. Express your final answer in standard form.

WS - Families of Quadratic Relations Answer Section

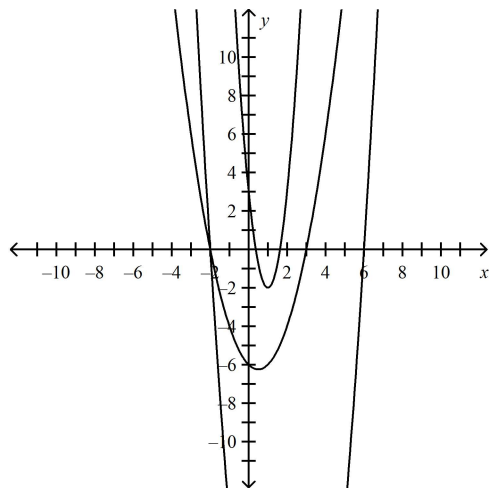
1. ANS:

no family, no common characteristic

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

$$y = 5(x - 1)^2 - 2$$

$$y = x^2 - 1x - 6$$



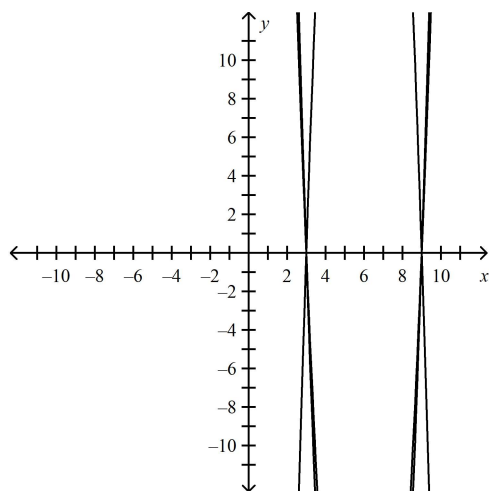
2. ANS:

family of common zeroes

$$y = 4(x - 3)(x - 9)$$

$$y = 5(x - 6)^2 - 45$$

$$y = -5x^2 + 60x - 135$$



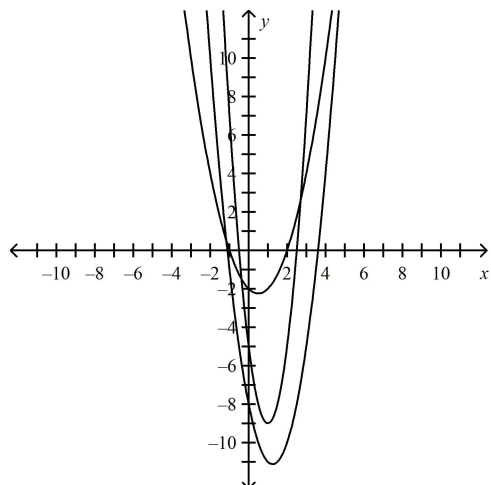
3. ANS:

no family, no common characteristic

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

$$y = 4(x - 1)^2 - 9$$

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



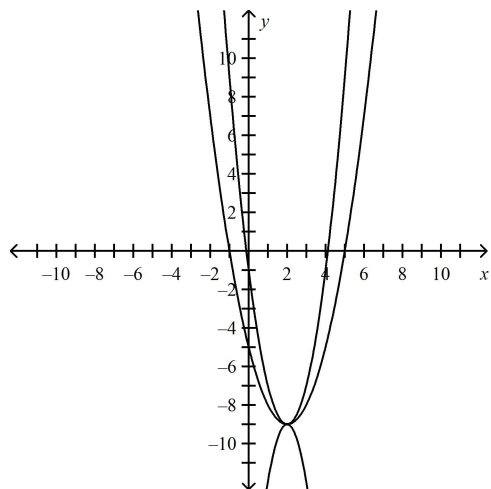
4. ANS:

family of common vertex

$$y = (x - 5)(x + 1)$$

$$y = -3(x - 2)^2 - 9$$

$$y = 2x^2 - 8x - 1$$



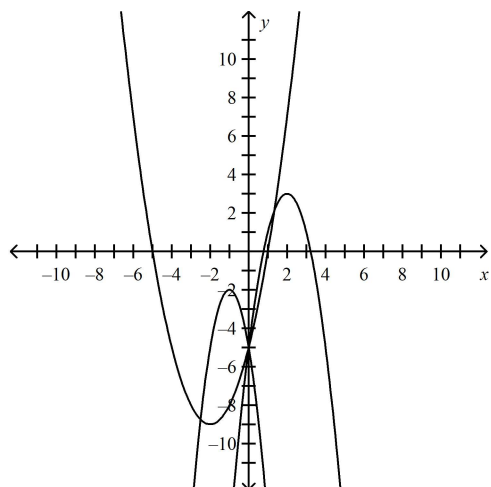
5. ANS:

family of common **y-intercept**

$$y = (x - 1)(x + 5)$$

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

$$y = -3x^2 - 6x - 5$$



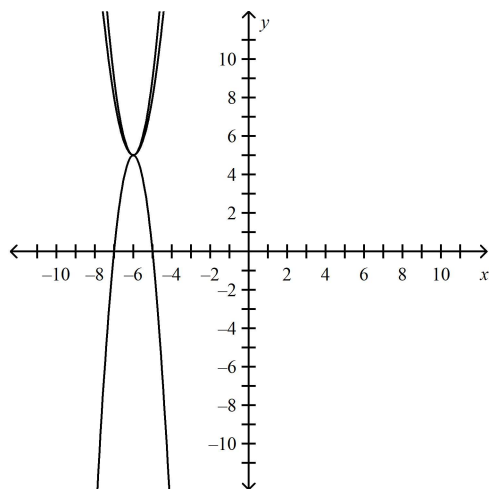
6. ANS:

family of common **vertex**

$$y = -5(x + 5)(x + 7)$$

$$y = 3(x + 6)^2 + 5$$

$$y = 4x^2 + 48x + 149$$



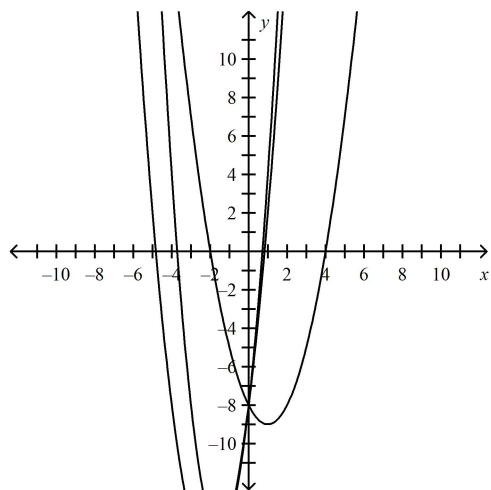
7. ANS:

family of common **y-intercept**

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

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

$$y = 3x^2 + 9x - 8$$



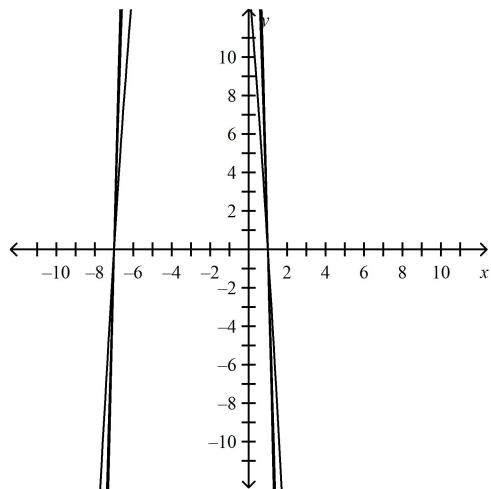
8. ANS:

family of common **zeroes**

$$y = -2(x + 7)(x - 1)$$

$$y = -4(x + 3)^2 + 64$$

$$y = -5x^2 - 30x + 35$$



9. ANS:

$$y = 2(x - 2 - 2\sqrt{5})(x - 2 + 2\sqrt{5})$$

$$y = 2(x - 2)^2 - 40$$

$$y = 2x^2 - 8x - 32$$

10. ANS:

factor, find roots, write another equation with same roots, expand

$$y = -5 \left[x - (10 - 4\sqrt{5}) \right] \left[x - (10 + 4\sqrt{5}) \right]$$

$$y = -5x^2 + 100x - 100$$

$$y = -5(x - 10)^2 + 400$$

$$V(10, 400)$$

$$P(8, 380)$$

$$y = -2x^2 + 40x - 40$$

$$y = -2(x - 10)^2 + 160$$

$$V(10, 160) \quad P(8, 152)$$

11. ANS:

factor, find roots, write another equation with same roots, expand

$$y = -2 \left[x - (6 + 0\sqrt{5}) \right] \left[x - (6 + 0\sqrt{5}) \right]$$

$$y = -2x^2 + 24x - 72$$

$$y = -2(x - 6)^2 + 0$$

$$V(6, 0)$$

$$P(-3, -162)$$

$$y = 3x^2 + -36x + 108$$

$$y = 3(x - 6)^2 + 0$$

$$V(6, 0) \quad P(-3, 243)$$

12. ANS:

$$y = -(x - 3 - 4\sqrt{7})(x - 3 + 4\sqrt{7})$$

$$y = -(x - 3)^2 + 112$$

$$y = -x^2 + 6x + 103$$

13. ANS:

$$y = 4(x + 3 - 1\sqrt{5})(x + 3 + 1\sqrt{5})$$

$$y = 4(x + 3)^2 - 20$$

$$y = 4x^2 + 24x + 16$$

14. ANS:

factor, find roots, write another equation with same roots, expand

$$y = 3 \left[x - \left(-3 + -2\sqrt{5} \right) \right] \left[x - \left(-3 + 2\sqrt{5} \right) \right]$$

$$y = 3x^2 + 18x + -33$$

$$y = 3(x - -3)^2 + -60$$

$$V(-3, -60)$$

$$P(-6, -33)$$

$$y = 4x^2 + 24x + -44$$

$$y = 4(x - -3)^2 + -80$$

$$V(-3, -80) \quad P(-6, -44)$$