

Unit 5 Practice #3

Transformations

Describe how the parent function $y = x^2$ was transformed to create each of the following quadratics.

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

2. $y = \frac{1}{5}x^2 - 10$

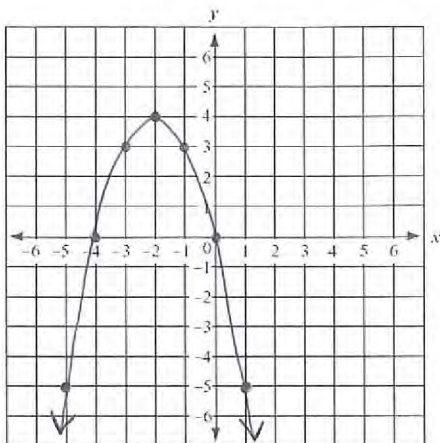
3. $y = 4(x - 7)^2 + 1$

4. $y = -\left(\frac{2}{3}x\right)^2$

Identifying Characteristics when looking at a Graph

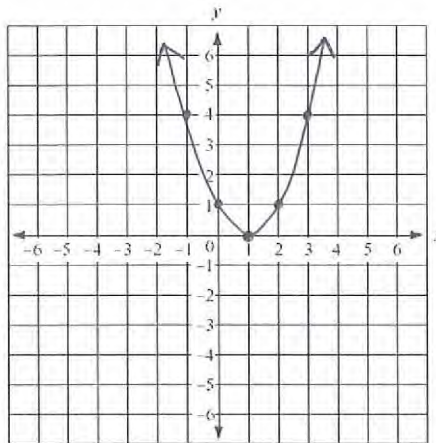
Identify the 9 characteristics listed.

5.



- Vertex: _____
- AOS: _____
- Extrema: _____
- y-intercept: _____
- x-intercept: _____
- zeros: _____
- Int of Inc: _____
- Int of Dec: _____
- ROC, $-5 \leq x \leq -3$: _____
- End Behavior:
 - as $x \rightarrow -\infty$, $y \rightarrow$ _____
 - as $x \rightarrow \infty$, $y \rightarrow$ _____

6.



- Vertex: _____
- AOS: _____
- Extrema: _____
- y-intercept: _____
- x-intercept: _____
- zeros: _____
- Int of Inc: _____
- Int of Dec: _____
- ROC, $-1 \leq x \leq 0$: _____
- End Behavior:
 - as $x \rightarrow -\infty$, $y \rightarrow$ _____
 - as $x \rightarrow \infty$, $y \rightarrow$ _____

Identifying Characteristics when looking at an Equation in Standard Form

For each equation, identify the vertex, axis of symmetry, extrema, and y-intercept.

7. $y = -x^2 - 14x + 2$

8. $y = 3x^2 + 18x - 5$

Identifying Characteristics when looking at an Equation in Vertex Form

For each equation, identify the vertex, axis of symmetry, extrema, and y-intercept.

9. $y = 2(x + 5)^2 + 4$

10. $y = -(x - 9)^2 - 1$

Identifying Characteristics when looking at an Equation in Intercept Form

For each equation, identify the vertex, axis of symmetry, extrema, y-intercept, and zeros.

11. $y = -2(x + 2)(x + 8)$

12. $y = (x - 6)(x + 4)$

Converting from Intercept Form to Standard Form

Write each equation in standard form.

13. $y = -2(x + 2)(x + 8)$

14. $y = (x - 6)(x + 4)$

Converting from Vertex Form to Standard Form

Write each equation in standard form.

15. $y = 2(x + 5)^2 + 4$

16. $y = -(x - 9)^2 - 1$

Converting from Standard Form to Intercept Form

Write each equation in intercept form.

17. $y = 2x^2 - 9x - 18$

18. $y = x^2 + x - 20$

Unit 5 Practice #3

Transformations

Describe how the parent function $y = x^2$ was transformed to create each of the following quadratics.

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

reflect over y-axis
horizontal shrink by 1/8
left 3

3. $y = 4(x - 7)^2 + 1$

vertical stretch by 4
right 7
up 1

2. $y = \frac{1}{5}x^2 - 10$

vertical shrink by 1/5
down 10

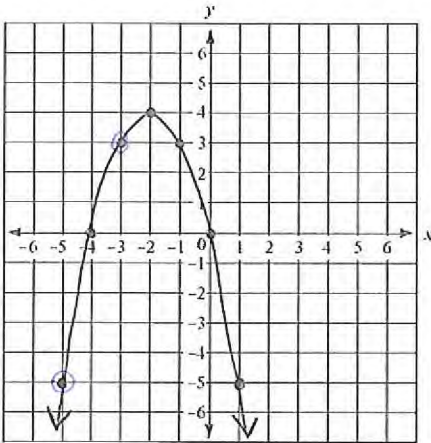
4. $y = -\left(\frac{2}{3}x\right)^2$

reflect over x-axis
horizontal stretch by 3/2

Identifying Characteristics when looking at a Graph

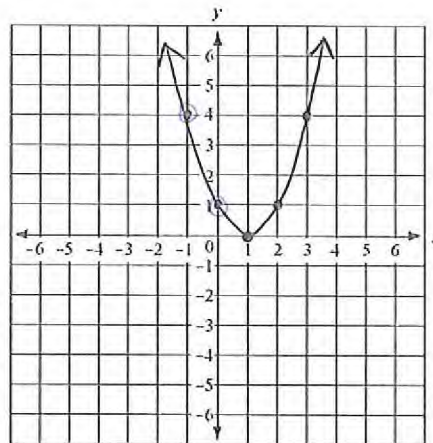
Identify the 9 characteristics listed.

5.



Vertex: $(-2, 4)$
 AOS: $x = -2$
 Extrema: max at 4
 y-intercept: $(0, 0)$
 x-intercept: $(0, 0), (-4, 0)$
 zeros: $0, -4$
 Int of Inc: $x \leq -2$
 Int of Dec: $x > -2$
 ROC, $-5 \leq x \leq -3$: $8/2 = 4$
 End Behavior:
 as $x \rightarrow -\infty$, $y \rightarrow -\infty$
 as $x \rightarrow \infty$, $y \rightarrow -\infty$

6.



Vertex: $(1, 0)$
 AOS: $x = 1$
 Extrema: min at 0
 y-intercept: $(0, 1)$
 x-intercept: $(1, 0)$
 zeros: 1
 Int of Inc: $x \geq 1$
 Int of Dec: $x < 1$
 ROC, $-1 \leq x \leq 0$: $-3/1 = -3$
 End Behavior:
 as $x \rightarrow -\infty$, $y \rightarrow \infty$
 as $x \rightarrow \infty$, $y \rightarrow \infty$

Identifying Characteristics when looking at an Equation in Standard Form

For each equation, identify the vertex, axis of symmetry, extrema, and y-intercept.

7. $y = -x^2 - 14x + 2$

$x = \frac{-b}{2a} = \frac{-(-14)}{2(-1)} = \frac{14}{-2} = -7$

$y = -(-7)^2 - 14(-7) + 2$
 $= -49 + 98 + 2$
 $= 49 + 2 = 51$

Vertex: $(-7, 51)$ extrema: max at 51
 AOS: $x = -7$ y-intercept: $(0, 2)$

8. $y = 3x^2 + 18x - 5$

$x = \frac{-b}{2a} = \frac{-(18)}{2(3)} = \frac{-18}{6} = -3$

$y = 3(-3)^2 + 18(-3) - 5$
 $= 27 - 54 - 5$
 $= -27 - 5 = -32$

Vertex: $(-3, -32)$ extrema: min at -32
 AOS: $x = -3$ y-intercept: $(0, -5)$

Identifying Characteristics when looking at an Equation in Vertex Form

For each equation, identify the vertex, axis of symmetry, extrema, and y-intercept.

9. $y = 2(x+5)^2 + 4$

Vertex: $(-5, 4)$
 AOS: $x = -5$
 extrema: min at 4
 y-intercept: $(0, 54)$

$y = 2(0+5)^2 + 4$
 $= 2(5)^2 + 4$
 $= 2(25) + 4$
 $= 50 + 4$
 $= 54$

10. $y = -(x-9)^2 - 1$

Vertex: $(9, -1)$
 AOS: $x = 9$
 extrema: max at -1
 y-intercept: $(0, -82)$

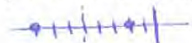
$y = -(0-9)^2 - 1$
 $= -(-9)^2 - 1$
 $= -81 - 1$
 $= -82$

Identifying Characteristics when looking at an Equation in Intercept Form

For each equation, identify the vertex, axis of symmetry, extrema, y-intercept, and zeros.

11. $y = -2(x+2)(x+8)$

Zeros: $-2, -8$
 AOS: $x = -5$
 Vertex: $(-5, 18)$
 extrema: max at 18
 y-intercept: $(0, -32)$



$y = -2(-5+2)(-5+8)$
 $= -2(-3)(3)$
 $= 18$
 $y = -2(0+2)(0+8)$
 $= -2(2)(8)$
 $= -32$

12. $y = (x-6)(x+4)$

Zeros: $6, -4$
 AOS: $x = 1$
 Vertex: $(1, -25)$
 extrema: min at -25
 y-intercept: $(0, -24)$



$y = (1-6)(1+4)$
 $= (-5)(5)$
 $= -25$
 $y = (0-6)(0+4)$
 $= (-6)(4)$
 $= -24$

Converting from Intercept Form to Standard Form

Write each equation in standard form.

13. $y = -2(x+2)(x+8)$

$= -2(x^2 + 8x + 2x + 16)$
 $= -2(x^2 + 10x + 16)$

$y = -2x^2 - 20x - 32$

14. $y = (x-6)(x+4)$

$= x^2 + 4x - 6x - 24$

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

Converting from Vertex Form to Standard Form

Write each equation in standard form.

15. $y = 2(x+5)^2 + 4$

$= 2(x+5)(x+5) + 4$
 $= 2(x^2 + 5x + 5x + 25) + 4$
 $= 2(x^2 + 10x + 25) + 4$
 $= 2x^2 + 20x + 50 + 4$

$y = 2x^2 + 20x + 54$

16. $y = -(x-9)^2 - 1$

$= -(x-9)(x-9) - 1$
 $= -(x^2 - 9x - 9x + 81) - 1$
 $= -(x^2 - 18x + 81) - 1$
 $= -x^2 + 18x - 81 - 1$

$y = -x^2 + 18x - 82$

Converting from Standard Form to Intercept Form

Write each equation in intercept form.

17. $y = 2x^2 - 9x - 18$

$-\frac{12}{-12} \cdot \frac{3}{3} = -36$
 $-\frac{12}{-12} + \frac{3}{3} = -9$
 $y = 2x^2 - 12x + 3x - 18$
 $y = (2x+3)(x-6)$

	x	-6
$2x$	$2x^2$	$-12x$
3	$3x$	-18

18. $y = x^2 + x - 20$

$-\frac{4}{-4} \cdot \frac{5}{5} = -20$
 $-\frac{4}{-4} + \frac{5}{5} = 1$
 $y = x^2 - 4x + 5x - 20$
 $y = (x+5)(x-4)$

	x	-4
x	x^2	$-4x$
5	$5x$	-20