Name: Key

Quadratics Review

Period: ____ Date: ________

Tell which of the following are quadratic. If it is quadratic, write it in standard form.

1. a) yes $\boxed{f(x) = -\frac{1}{3}x^2 + \frac{4}{3}x - \frac{20}{3}}$

a) $f(x) = -\frac{1}{3}(x-2)^2 + 8$

$f(x) - \frac{1}{3}(x-2)(x-2) + 8$

$-\frac{1}{3}(x^2 - 4x + 4) + 8 = -\frac{1}{3}x^2 + \frac{4}{3}x - \frac{4}{3} + 8$ $\frac{24}{3}$

b) $f(x) = 6x^5 - 2x^2(2 + 3x^3)$

$f(x) = 6x^3 - 4x^2 - 6x^3$

$\boxed{f(x) = -4x^2}$ $\boxed{\text{yes}}$

c) $f(x) = x^3 - x(x-2) + x$

$f(x) = x^2 - x^2 + 2x + x$

$\boxed{f(x) = 3x}$ $\boxed{\text{No}}$

d) $f(x) = 3x + \pi x^2 - \pi$

$f(x) = \pi x^2 + 3x - \pi$ $\boxed{\text{No}}$

2. Fill in the following information based on the provided graph.

Vertex: (4, -9)

Axis of Symmetry: x = 4

Direction of opening: up ("a" is positive)

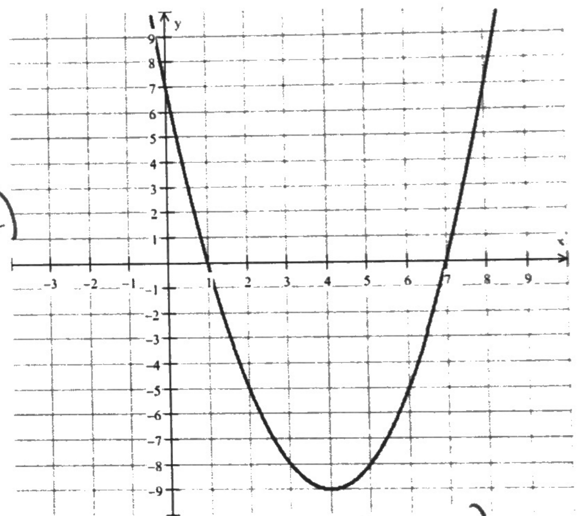
x- intercepts (1, 0), (7, 0)

y-intercept: (0, 7)

Max or min: Min y = -9

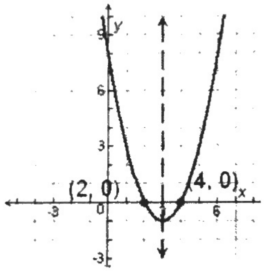
Domain: $(-\infty, \infty)$

Range: $[-9, \infty)$



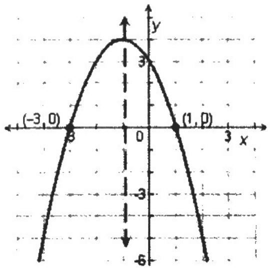
(4, -9)

3. Identify the domain and range.



D: $(-\infty, \infty)$

R $[-1, \infty)$



D: $(-\infty, \infty)$

R: $(-\infty, 4]$

4. Identify the zero(s) of the function Represent by the table. (where "y" is zero)

(-3, 0) (1, 0)

x	−3	−2	−1	0	1
$f(x)$	0	3	4	3	0

5. For the following function, complete the table and state the maximum or minimum of the function .

$$F(x) = 2x^2 - 4x - 6$$

Max or Min $(1, -8)$

$f(1) = 2(1)^2 - 4(1) - 6$
$2 - 4 - 6$
$-2 - 6 = -8$

$f(2) = 2(2)^2 - 4(2) - 6$
$8 - 8 - 6 = -6$

$f(3) = 2(3)^2 - 4(3) - 6$
$18 - 12 - 6 = 0$

$f(-2) = 2(-2)^2 - 4(-2) - 6$
$2(4) + 8 - 6$
$8 + 8 - 6$
$16 - 6 = 10$

$f(-1) = 2(-1)^2 - 4(-1) - 6$
$2(1) + 4 - 6$
$2 + 4 - 6 = 0$

$f(0) = 2(0)^2 - 4(0) - 6$
$0 - 0 - 6 = -6$

X	F(x)
-2	10
-1	0
0	-6
1	-8
2	-6
3	0

Given the quadratic functions:

6. $y = 4x^2 - 2x + 3$, find the vertex.

$\boxed{\text{Vertex} = \left(\frac{1}{4}, \frac{11}{4}\right)}$

$x = \frac{-b}{2a} = \frac{-(-2)}{2(4)} = \frac{2}{8}$

$x = \frac{1}{4}$

$y = 4\left(\frac{1}{4}\right)^2 - 2\left(\frac{1}{4}\right) + 3$

$y = 4 \cdot \frac{1}{16} - \frac{2}{4} + 3$

$y = \frac{1}{4} - \frac{2}{4} + \frac{12}{4} = \frac{11}{4}$

7. $y = 2x^2 - 8x + 3$, find the vertex.

$\boxed{\text{Vertex} = (2, -5)}$

$x = \frac{-b}{2a} = \frac{-(-8)}{2(2)} =$

$x = 2$

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

$y = 2 \cdot 4 - 16 + 3$

$y = 8 - 16 + 3$

$y = -8 + 3 \quad y = -5$

8) Write the equation in vertex form: Vertex at (4, 9) & contains (10, 21)

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

$21 = a(10-4)^2 + 9$

$21 = a(6)^2 + 9$

$-9 \qquad -9$

$\frac{12}{36} = \frac{36a}{36}$

$a = \frac{1}{3}$

$\boxed{y = \frac{1}{3}(x-4)^2 + 9}$

9) Write an equation in expanded (standard) form that has a vertex at (-8, 10) an "a" value of $-\frac{1}{4}$

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

$y = -\frac{1}{4}(x+8)^2 + 10$

$y = -\frac{1}{4}(x+8)(x+8) + 10$

$y = -\frac{1}{4}(x^2 + 16x + 64) + 10$

$y = -\frac{1}{4}x^2 - 4x - 16 + 10$

$\boxed{y = -\frac{1}{4}x^2 - 4x - 6}$

10) Write the equation in vertex form given the critical points from the graph: Point on Graph: (1, -21), Axis of Symmetry: x = -3, "a" Value: -1

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

$-21 = -1(1 - -3)^2 + k$

$-21 = -1(1+3)^2 + k$

$-21 = -1 \cdot 16 + k$

$-21 = -16 + k$

$+16 \quad +16$

$5 = k$

$\boxed{y = -1(x+3)^2 + 5}$

11) Multiply.

A) $(2x-3)(1x+4)$

$2x^2 + 8x - 3x - 12$

$\boxed{2x^2 + 5x - 12}$

b) $(2x+3)(1x+4)$

$2x^2 + 8x + 3x + 12$

$\boxed{2x^2 + 11x + 12}$

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

$4x^2 + 10x - 10x - 25$

$\boxed{4x^2 - 25}$

d) $(5x-2)^2$

$(5x-2)(5x-2)$

$25x^2 - 10x - 10x + 4$

$\boxed{25x^2 - 20x + 4}$

12. Factor all of the following for a-k

a) $x^2 - 15x + 44$

44

-4 | -11

$\boxed{(x-4)(x-11)}$

b) $2x^2 - 11x + 15$

$2 \cdot 15$

30

1 | 30

2 | 15

3 | 10

-5 | -6

$(x - \frac{5}{2})(x - \frac{6}{2})$

$\boxed{(2x-5)(x-3)}$

c) $6x^2 + 7x - 3$

$6 \cdot 3$

-18

1 | 18

-2 | 9

3 | 6

$(x - \frac{2}{6})(x + \frac{9}{6})$

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

$\boxed{(3x-1)(2x+3)}$

d) $x^2 - x - 56$

-56

1 | 56

2 | 28

4 | 15

7 | -8

$3\overline{)56}$

$\boxed{(x-8)(x+7)}$

Factor out GCF

e) $24x^2y^3 - 6x^2y$

$\boxed{6x^2y(4y-1)}$

f) $-35a^2b^3 + 21a^2b - 49ac^2$

$-7a(5ab^3 - 3ab + 7c^2)$

g) $9x^2 - 49$

$\boxed{(3x-7)(3x+7)}$

h) $25a^2 - 20a + 4$

$\boxed{(5a-2)(5a-2) \text{ or } (5a-2)^2}$

i) $100x^2 - 1$

$\boxed{(10x-1)(10x+1)}$

j. $10x^2 - 13x - 3$

$10 \cdot -3$

-30

1	30
2	15
-3	-10

$(x - \frac{3}{10})(x - \frac{10}{10})$

$\boxed{(10x-3)(x-1)}$

k. $3x^2 - 14x + 15$

$3 \cdot 15$

45

1	45
3	15
-5	-9

$(x - \frac{5}{3})(x - \frac{9}{3})$

$\boxed{(3x-5)(x-3)}$

13. Fill in the following information based on the provided graph.

Vertex: $(1, -16)$

Axis of Symmetry: $x = 1$

Direction of opening: up

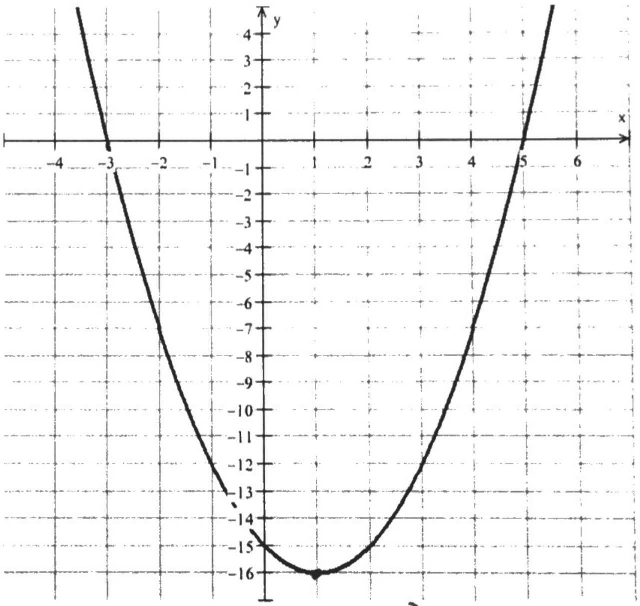
x- intercepts $(-3, 0)$ $(5, 0)$

y-intercept: $(0, -15)$

Max or min: min $y = -16$

Domain: $(-\infty, \infty)$ or All Real #

Range: $[-16, \infty)$ $y \geq -16$



$(1, -16)$

14. A rectangle has a length that is 4 meters more than its width. Write and equation, A(w), for the area in terms of width.

$l = w + 4$ $\quad A = lw$

$\boxed{A(w) = (w+4)w \text{ or } A(w) = w(w+4) \text{ or } A(w) = w^2 + 4w}$

15. The base of a triangle is 6 feet shorter than 2 times the height. Write an equation for the area of the triangle, A(b), in terms of the base.

$A = \frac{1}{2}bh$

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

$b = 2h - 6$

$+6 \quad +6$

$\frac{b+6}{2} = \frac{2h}{2}$

$b/2 + 3 = h$