Finding Key Features of Quadratics ws

Name: Key Hr:____

Find the vertex given an equation in standard form $y = ax^2 + bx + c$ using $\frac{-b}{2a}$.

1. $y = x^2 - 4x + 1$

$\frac{-(-4)}{2(1)} = \frac{4}{2} = 2$ $\quad 4 - 8 + 1$

(2, -3)

2. $y = -5x^2 + 10x + 4$

$\frac{-10}{2(-5)} = \frac{-10}{-10} = 1$ $\quad -5 + 10 + 4$

(1, 9)

Find the vertex given an equation in vertex form $y = a(x-h)^2 + k$.

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

(1, 2)

4. $y = -0.5(x+3)^2$

(-3, 0)

5. $y = x^2 - 5$

(0, -5)

Find the vertex given an equation in factored form $y = (x-p)(x-q)$ using $\frac{p+q}{2}$.

6. $y = (x-2)(x-6)$ $\quad (2)(-2)$

$x = 2, 6$ $\quad \frac{2+6}{2} = 4$

(4, -4)

7. $y = -2(x+3)(x+7)$ $\quad -2[(-2)(2)]$

$x = -3, \; x = -7$

$\frac{-3-7}{2} = \frac{-10}{2} = -5$

(-5, 8)

8. $y = (x-3)(x+3)$ $\quad (-3)(3)$

$x = +3, \; x = -3$

$\frac{3-3}{2} = 0$

(0, -9)

Find the vertex.

9. $y = -x^2 + 6x + 8$

$\frac{-6}{2(-1)} = \frac{-6}{-2} = 3$ $\quad -9 + 18 + 8$

(3, 17)

10. $y = x^2 - 16$

(0, -16)

11. $y = (x-5)(x-3)$

$x = 5, \; x = 3$

$\frac{5+3}{2}$

(4, -1)

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

(-4, 5)

13. $y = (x+5)(x-3)$ $\quad +5, \; -4$

$x = -5 \quad x = 3$ $\quad \frac{-5+3}{2} = \frac{-2}{2} = -1$

(-1, -16)

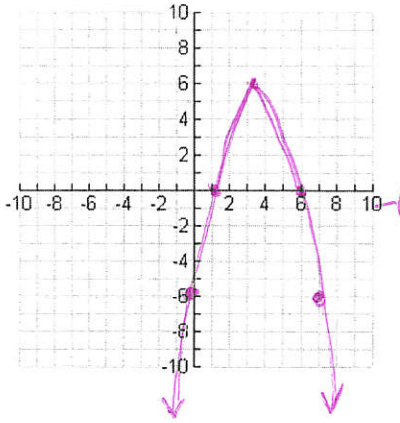
14. $y = 2x^2 - 3x + 1$

$\frac{-(-3)}{2(2)} = \frac{3}{4}$

$\left(\frac{3}{4}, -\frac{1}{8}\right)$

Given the equations, find the parts and sketch a graph.

15. $f(x) = -x^2 + 7x - 6$



$\frac{-7}{2(-1)} = \frac{-7}{-2} = 3.5$

$-(x^2 - 7x + 6)$

$-(x-1)(x-6)$ $\quad -1 \quad -6$

$x - 1 = 0 \quad x = 1$

$x - 6 = 0 \quad x = 6$

A) Vertex (3.5, 6.25)

B) Vertex Form $y = -(x-3.5)^2 + 6.25$

C) Axis of Symmetry $x = 3.5$

D) Max/Min & its value max @ 6.25

E) y-intercept (0, -6)

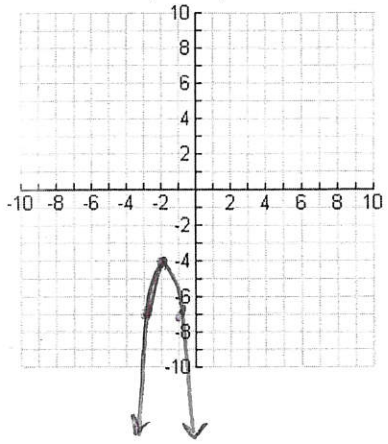
F) x-intercept(s) (1, 0), (6, 0)

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

H) Range $(-\infty, 6]$

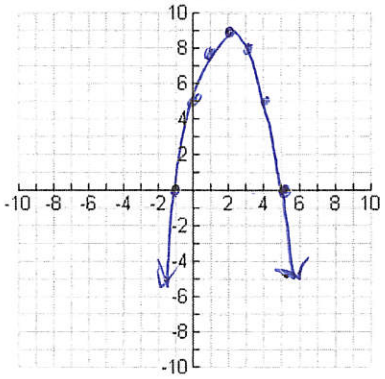
I) Find f(-1) 0

16. $f(x) = -3(x+2)^2 - 4$



A) Vertex (-2, -4)
B) Vertex Form $y = -3(x+2)^2 - 4$
C) Axis of Symmetry $x = -2$
D) Max/Min & its value max @ -4
E) y-intercept (0, -16)
F) x-intercept(s) none
G) Domain $(-\infty, \infty)$
H) Range $(-\infty, -4]$
I) Find f(-3) -7

17. $f(x) = -(x+1)(x-5)$

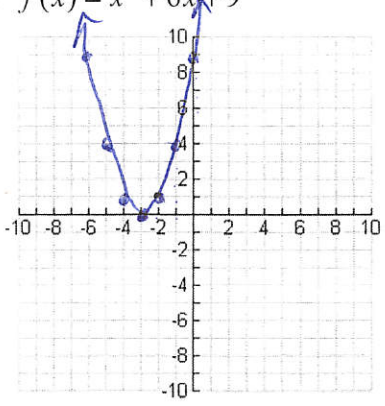


$-(3)(-3)$

$-(4)(-2) = 8$

A) Vertex (2, 9)
B) Vertex Form $y = -(x-2)^2 + 9$
C) Axis of Symmetry $x = 2$
D) Max/Min & its value max at 9
E) y-intercept (0, 5)
F) x-intercept(s) (-1, 0) (5, 0)
G) Domain $(-\infty, \infty)$
H) Range $(-\infty, 9]$
I) Find f(3) 8

18. $f(x) = x^2 + 6x + 9$



$\frac{-6}{2(1)} = -3$

$9 - 18 + 9$

A) Vertex (-3, 0)
B) Vertex Form $y = (x+3)^2$
C) Axis of Symmetry $x = -3$
D) Max/Min & its value min at 0
E) y-intercept (0, 9)
F) x-intercept(s) (-3, 0)
G) Domain $(-\infty, \infty)$
H) Range $[0, \infty)$
I) Find f(-5) 4