Math 20-2 KEY

7.16 – Worksheet

Part 1: Working with Standard and Factored Forms

Use the following information to answer Q1-Q4:

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

y-int

Q1: The y-intercept is

a. -3
b. -2
c. 2
d. 3

Q2: Converting to *Factored Form*, the zeroes of the function are at ***-a*** and ***+b***, where ***a*** and ***b*** are ___ and ___.

-3 +1

*(Record your **two-digit** answer in the Numerical Response boxes below)*

3	1		

$f(x) = (x+3)(x-1)$

$0 = (x+3)(x-1)$

$x+3=0$ $\quad$ $x-1=0$

$x=-3$ $\quad$ $x=1$

Q3: The axis of symmetry is given by the equation

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

a. $x = -1$
b. $x = +1$
c. $y = -1$
d. $y = +1$

Q4: The coordinates of the vertex is given by (***-a, -b***), where ***a*** and ***b*** are ___ and ___.

*(Record your **two-digit** answer in the Numerical Response boxes below)*

1	4		

$f(-1) = (-1)^2 + 2(-1) - 3$

$= 1 - 2 - 3$

$= -4$

Vertex at $(-1, -4)$

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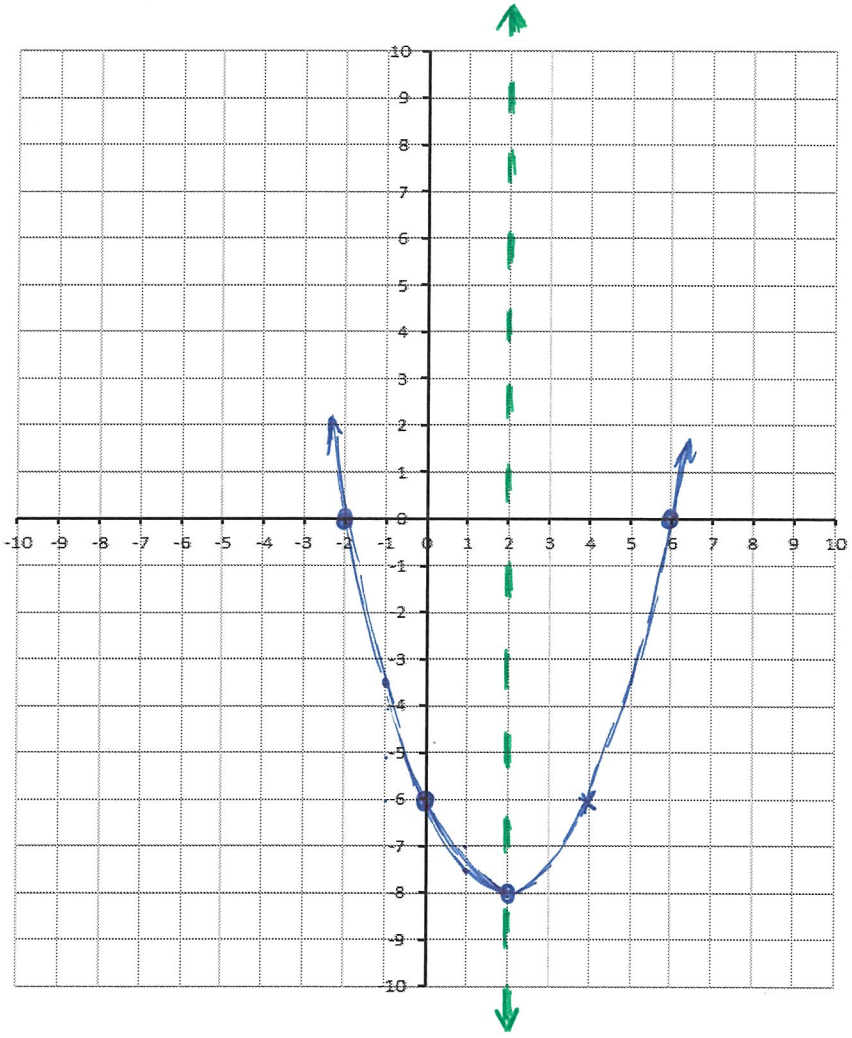
Q5: A student is working with a quadratic function, and has determined the following information:

- Y-Intercept of -6
- Zeroes of -2 and 6
- Axis of Symmetry is $x = 2$
- Vertex is located at (2, -8)

Sketch the quadratic function below.



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KEY

Use the following information to answer Q6-Q10:

$$f(x) = -x^2 + 8x - 12$$

Q6: The y-intercept is ***-ab***, where ***a*** and ***b*** are ___ and ___. y-int

*(Record your **two-digit** answer in the Numerical Response boxes below)*

1	2		

Q7: Converting to *Factored Form*, the zeroes of the function are

a. -6, -2
b. -6, 2
c. 6, -2
d. 6, 2

$f(x) = -1(x^2 - 8x + 12)$
$0 = -1(x-2)(x-6)$
$x-2=0$ $\quad x-6=0$
$x=2$ $\quad x=6$

Q8: Determine the equation for the axis of symmetry.

$\frac{(2)+(6)}{2} = 4$ $\quad \boxed{x=4}$

Q9: The coordinates of the vertex is given by (***a, b***), where ***a*** and ***b*** are ___ and ___.

*(Record your **two-digit** answer in the Numerical Response boxes below)*

4	4		

$f(4) = -(4)^2 + 8(4) - 12$
$= -16 + 32 - 12$
$= 4$

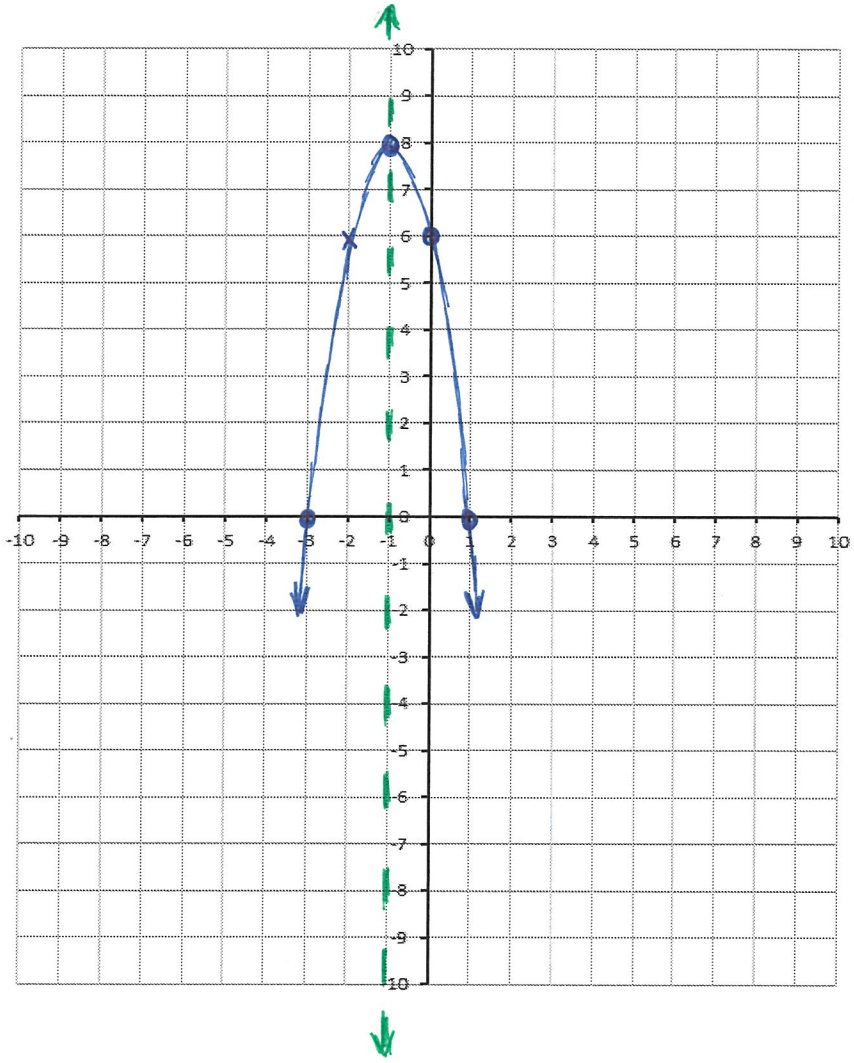
Vertex is $(4, 4)$

KEY

Q10: A student is working with a quadratic function, and has determined the following information:

- Y-Intercept of 6
- Zeroes of -3 and 1
- Axis of Symmetry is $x = -1$
- Vertex is located at (-1, 8)

Sketch the quadratic function below.



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Use the following information to answer Q11:

$$f(x) = 2x^2 + 9x + 4$$

y-int = 4

Q11: Determine the (a) y-intercept, (b) zeroes, (c) equation of the line of symmetry, and (d) coordinates of the vertex. Finally, (e) sketch the function below.

$0 = 2x^2 + 9x + 4$

+1 +8
□ + □ = 9
□ × □ = 8

$0 = 2x^2 + 1x + 8x + 4$

$0 = (2x^2 + 1x) + (8x + 4)$

$0 = x(2x+1) + 4(2x+1)$

$0 = (2x+1)(x+4)$

$2x+1 = 0$ | $x = -4$

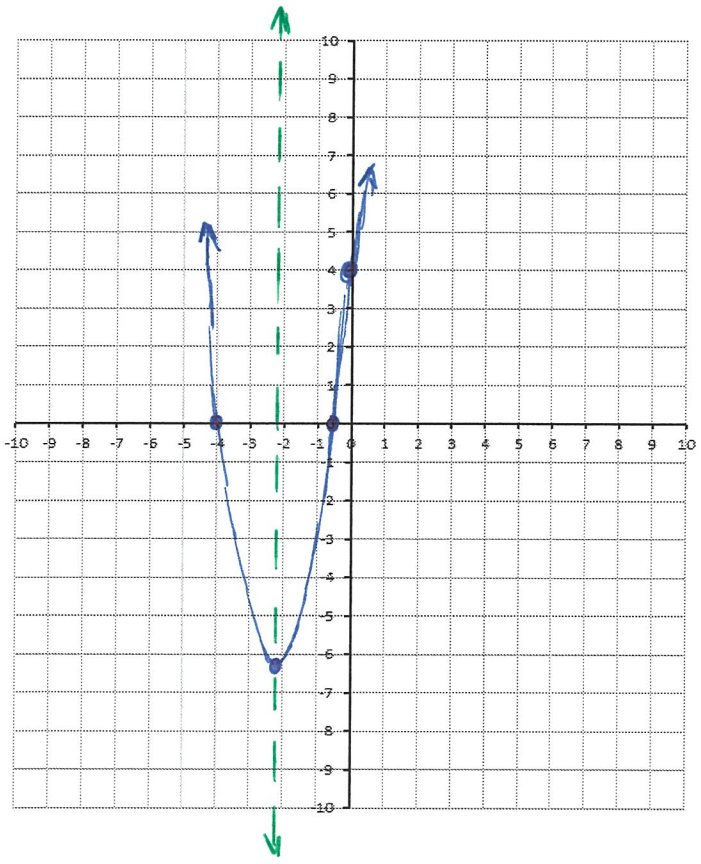
$x = -1/2$ Zeroes

$\frac{(-4) + (-\frac{1}{2})}{2} = -2.25$

$x = -2.25$

$f(-2.25) = 2(-2.25)^2 + 9(-2.25) + 4$
$= 10.125 - 20.25 + 4$
$= -6.125$

Vertex at $(-2.25, -6.125)$



KEY

Part 2: Working with Vertex Form

Use the following information to answer Q12-Q14:

$$f(x) = 1(x-7)^2 - 1$$

Q12: The coordinates of the vertex is

a. (-7,1)
b. (7,-1)
c. (-1,7)
d. (1,-7)

Q13: The zeroes of the function are ***a*** and ***b***, where ***a*** and ***b*** are ___ and ___.

*(Record your **two-digit** answer in the Numerical Response boxes below)*

8	6		

or

6	8		

$0 = 1(x-7)^2 - 1$
$+1 \qquad +1$
$1 = (x-7)^2$
$\sqrt{1} = (x-7)$
$+1 = x-7 \qquad -1 = x-7$
$x = 8 \qquad x = 6$

Q14: Convert the function to *Standard Form*.

$f(x) = 1(x-7)(x-7) - 1$
$= x^2 - 14x + 49 - 1$
$= x^2 - 14x - 48$

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Use the following information to answer Q15-Q17:

$$f(x) = -2(x-3)^2 + 8$$

Q15: Determine (a) the coordinates of the vertex, and (b) the zeroes.

(A) (3, 8)

(B) $0 = -2(x-3)^2 + 8$

$-8 \quad\quad -8$

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

$\div(-2) \quad \div(-2)$

$4 = (x-3)^2$

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

$+2 = x-3$

$+3 \quad +3$

$5 = x$

$-2 = x-3$

$+3 \quad +3$

$1 = x$

Q16: Convert the function to *Standard Form* to determine the y-intercept.

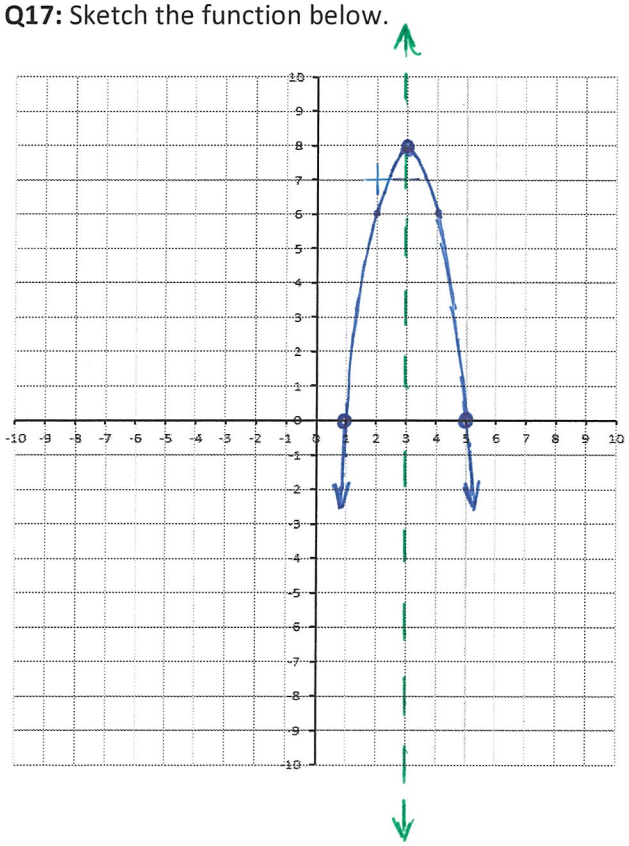
$f(x) = -2(x-3)(x-3) + 8$

$= -2(x^2 - 6x + 9) + 8$

$= -2x^2 + 12x - 18 + 8$

$= -2x^2 + 12x - 10$

Q17: Sketch the function below.



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Q18: The function $f(x) = 1(x-p)^2 + q$ is modelled below. Sketch the function $g(x) = \frac{1}{2}(x-p)^2 + q$ on the same graph paper.

Same (p, q) Vertex