KEY

First Name: _____ Last Name: _____

L13 – FQ – 3.3 Completing the Square

Q1: Convert the equation $f(x) = x^2 - 3x + 6$ into Vertex Form. *(2 marks)*

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

$= (x^2 - 3/2x - 3/2x) + 6 \rightarrow (x - 3/2)(x - 3/2) = x^2 - 3/2x - 3/2x + 9/4$

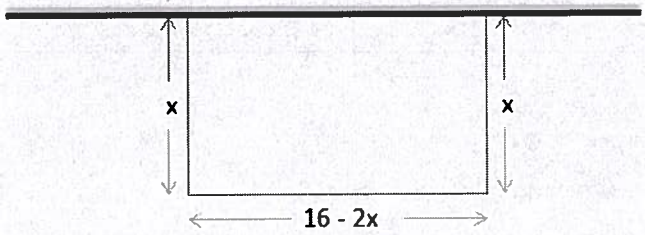
$= (x^2 - 3/2x - 3/2x + 9/4) + 6 - 9/4$

$f(x) = (x - 3/2)^2 + \frac{15}{4}$

KEY

Use the following information to answer Q2:

A home owner wishes to create a fenced in "dog run" on the side of their house. They have 16m of fencing. What dimensions would allow them to fence in the maximum area?



Q2: To have the maximum amount of area fenced in, the value of **x** must be:

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

4	.	0	0

$A = LW$

$A(x) = (x)(16 - 2x)$

$= -2x^2 + 16x + 0$

$= (-2x^2 + 16x) + 0$

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

$= -2(x^2 - 4x - 4x) + 0 \rightarrow (x-4)(x-4) = x^2 - 4x - 4x + 16$

$= -2(x^2 - 4x - 4x + 16) + 0 + 32$

$= -2(x-4)^2 + 32$

Vertex at $(x, A) = (4, 32)$

When $x = 4$, $A(x) = 32$

Q3: Determine the zeroes of the function are $x_1 = a$ and $x_2 = b$, where ***a*** and ***b*** are ___ and ___.

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

0	8		

or

8	0		

Standard Form

$A(x) = -2x^2 + 16x + 0$

$0 = -2x^2 + 16x$

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

$0 = x^2 - 8x$

$0 = (x)(x-8)$

$x = 0$ or $x - 8 = 0$, $x = 8$

So $x = 0, 8$

or

Vertex Form

$A(x) = -2(x-4)^2 + 32$

$0 = -2(x-4)^2 + 32$

$-32 \quad -32$

$-32 = -2(x-4)^2$

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

$16 = (x-4)^2$

$\sqrt{16} = (x-4)$

$+4 = x-4$ or $-4 = x-4$

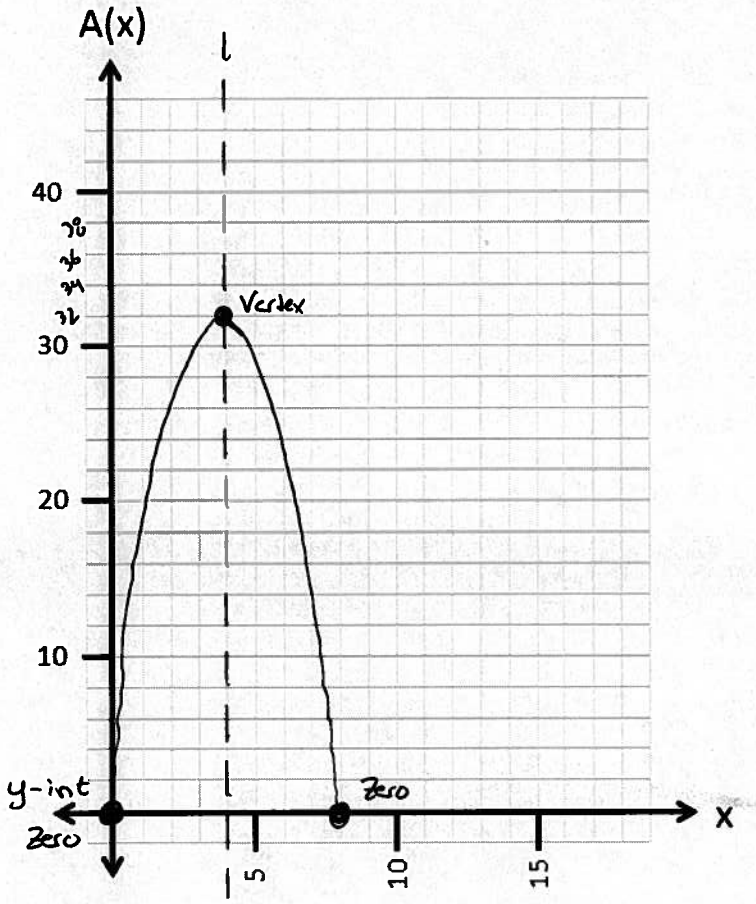
$+4 \quad +4 \quad +4 \quad +4$

$8 = x$ or $0 = x$

KEY

Q4: Sketch a graph of the function *A(x)*, and label the following: *(2 marks)*

- Axis of Symmetry $x = 4$
- Vertex $(4, 32)$
- Zeroes $x = 0, 8$
- Y-Intercept $y = 0$



MARKING

Beginning	0.0 – 2.5
Progressing	3.0 – 4.0
Competent	4.5 – 5.5
Exemplary	6.0