Math 123
Quiz 3
Fall 2013

Name Key

Show All Work

1) Without graphing, determine the vertex of the parabola that is the graph of the given function. State whether the parabola opens upward or downward.

a) $h(x) = 4(x+1)^2 - 9$

opens up

Vertex $(-1, -9)$ $\leftrightarrow$ using $h(x) = a(x-h)^2 + k$

b) $f(x) = x^2 - 8x + 25$

opens up

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

$k = 4^2 - 8 \cdot 4 + 25 = 16 - 32 + 25 = 9$

Vertex $(4, 9)$

2) Graph the parabola $f(x) = (x-1)^2 - 3$

Vertex $(1, -3)$

y intercept

if $x = 0$ $y = (-1)^2 - 3 = -2$

x-intercepts

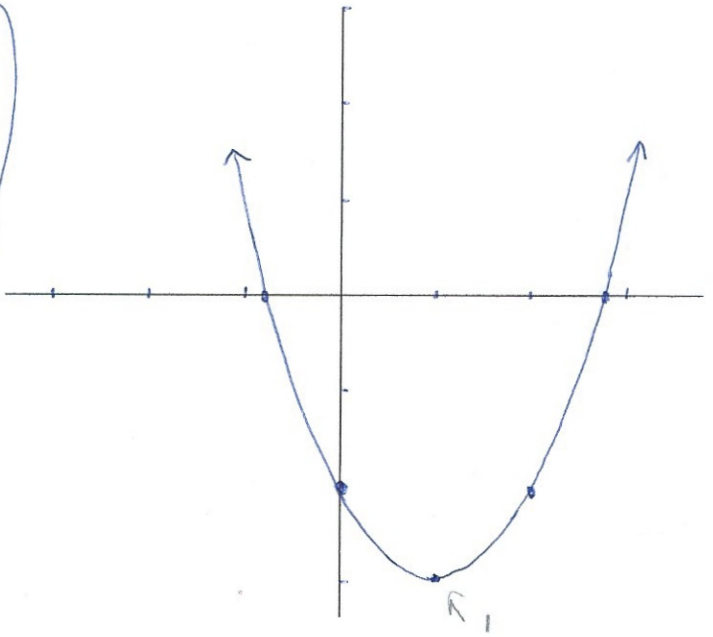
$0 = (x-1)^2 - 3$

$3 = (x-1)^2$

$\pm\sqrt{3} = x - 1$

$1 \pm \sqrt{3} = x$

Since not listed any point used to find width is acceptable



3) The revenue function R(x) and the cost function C(x) for a particular product are given. These functions are valid only for the specified domain of values. Find the number of units that must be produced to break even.

$$R(x) = 400x - 2x^2;\ C(x) = -x^2 + 200x + 1900;\ 0 \le x \le 100$$

$400x - 2x^2 = -x^2 + 200x + 1900$

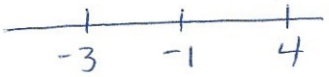
$0 = x^2 - 200x + 1900$

$0 = (x - 190)(x - 10)$

$x = 190$ or $\boxed{x = 10}$

NOT in bounds

4) Graph $f(x) = (x + 3)(x - 4)(x + 1)$




$f(-4) = (-1)(-8)(-3) = -24$

$f(-2) = (1)(-6)(-1) = 6$

$f(0) = (3)(-4)(1) = -12$

$f(5) = (8)(1)(6) = 48$