PREC11 Name____________________

Quiz3.2/3.3(F)

Clearly show all work when needed.

1. Graph each quadratic in your calculator and determine the following (nearest tenth):

a) $y = 0.8x^2 - 3x - 6$

Vertex: $(1.9, -8.8)$

Axis of symmetry: $x = 1.9$

y-intercept: $y = -6$

x-intercept(s): -1.4 , 5.2

Domain (set notation): $\{x \mid x \in \mathbb{R}\}$

Range (set notation): $\{y \mid y \geq -8.8, y \in \mathbb{R}\}$

b) $f(x) = -0.3x^2 + 16x + 15$

Vertex: $(26.7, 228.3)$

Axis of symmetry: $x = 26.7$

y-intercept: $y = 15$

x-intercept(s): -0.9 , 54.3

Domain (set notation): $\{x \mid x \in \mathbb{R}\}$

Range (set notation): $\{y \mid y \leq 228.3, y \in \mathbb{R}$

2. A cricket jumps off a tree branch and follows a parabolic path until he lands on the ground below. The height (h) of the cricket in centimeters at time (t) in seconds after jumping is given by the function $h(t) = -0.4t^2 + 5t + 4$. Graph the function in your calculator and answer the following (nearest tenth if necessary).

a) What is the y-intercept? What does it mean?

$y = 4$

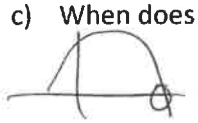
initial height is 4cm

b) What is the vertex? What does it tell you about the situation?

$(6.2, 19.6)$

max height 19.6 cm at time 6.2s

c) When does the cricket land on the ground?



$\boxed{13.3s}$

1.2E-12

1.2×10⁻¹²

0.0000000000012

d) State the domain and range in set notation.

D: $\{t \mid 0 \leq t \leq 13.3, t \in \mathbb{R}\}$

R: $\{h \mid 0 \leq h \leq 19.6, h \in \mathbb{R}\}$

3. Change the following quadratic functions to vertex form by completing the square:

a) $y = x^2 - 12x + 20$

$y = (x^2 - 12x + 36) + 20 - 36$

$\boxed{y = (x-6)^2 - 16}$

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

$= -2(x^2 + 4x + 4) - 3 + 8$

$\boxed{f(x) = -2(x+2)^2 + 5}$

c) $y = x^2 + 3x + 1$

$= (x^2 + 3x + 9/4) + 1 - 9/4$

$\boxed{y = (x + 3/2)^2 - 5/4}$

/3

20

$L + 2w = 100$

$L = 100 - 2w$

4. A farmer has 100 m of fencing to make a corral. One length of the coral will be along a barn so no fencing would be needed.

   a) Write a quadratic function in standard form that gives the area (A) of the corral as a function of its width (w).

   $A(w) = -2w^2 + 100w$

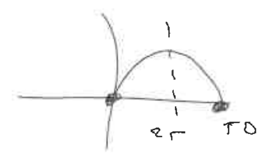
   $A(w) = lw$
   $= (100 - 2w)w$
   $= 100w - 2w^2$
   $= -2w^2 + 100w.$

   b) Convert your function into vertex form.

   $A(w) = -2(w-25)^2 + 1250$

   c) What is the maximum area possible and what width will make it happen?

   $1250\ m^2$ when $w = 25\ m$

   d) State the domain and range in set notation.

   $D: \{w \mid 0 < w < 50, w \in \mathbb{R}\}$
   $R: \{A \mid 0 < A \leq 1250, A \in \mathbb{R}\}$

5. Last year the grad class sold chocolate bars to raise funds. They sold 2000 bars at a price of \$4 per bar. This year's class wants to raise the price but figures that for every dollar increase in the price they will sell 50 less chocolate bars.

   a) Write a quadratic that models the revenue (R) as a function of the cost increase (c).

   $R(c) = (4 + c)(2000 - 50c)$

   $8000 - 200c + 2000c - 50c^2$

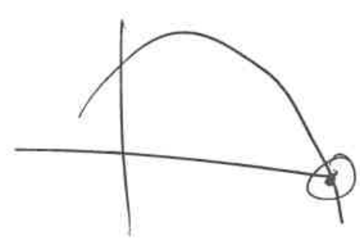
   $R(c) = -50c^2 + 1800c + 8000$

   b) What will be the maximum possible revenue and what chocolate bar cost produces it? (use graphing calculator or complete the square to solve)

   $R(c) = -50(c-18)^2 + 24200$

   \$24,200 when $c = 18$ $+4$

   costs \$22

   c) State the domain of the function in set notation.

   $\{c \mid 0 \leq c \leq 40, c \in W\}$