Math 151 - Quiz 2
September 2, 2015

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Find the linear function whose graph passes through $(3, 1)$ and $(5, 5)$.

$m = \frac{\Delta y}{\Delta x} = \frac{5-1}{5-3} = \frac{4}{2} = 2$

$f(x) = 2x + b$

$f(3) = 1 \Rightarrow 2(3) + b = 1$

$6 + b = 1 \Rightarrow b = -5$

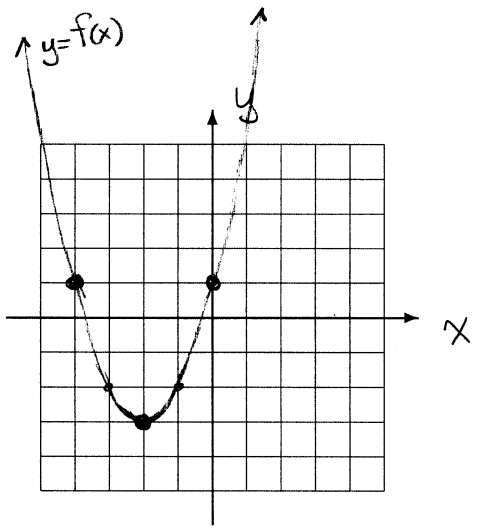
$f(x) = 2x - 5$

2. (2 points) Let $f(x) = (x+2)^2 - 3$. Determine the graph's vertex and two other points on the graph. Then carefully sketch the graph and determine the range of f.

Vertex is $(-2, -3)$

$x = 0 \Rightarrow f(0) = 2^2 - 3 = 4 - 3 = 1 \quad (0, 1)$

$x = -4 \Rightarrow f(-4) = (-2)^2 - 3 = 4 - 3 = 1 \quad (-4, 1)$



3. (2 points) Find the x- and y-intercepts of the graph of $g(x) = 3x^2 - x - 10$.

$3x^2 - x - 10 = 0$

$(3x + 5)(x - 2) = 0$

$x = -\frac{5}{3}$ or $x = 2$

$\left(-\frac{5}{3}, 0\right) \quad (2, 0)$

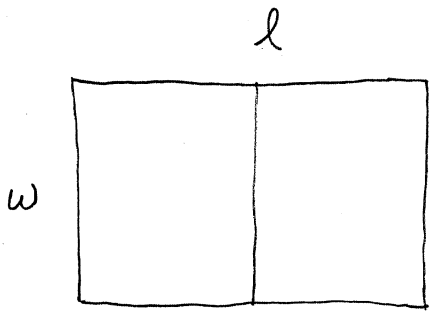
X-INTERCEPTS

$g(0) = -10$

$(0, -10)$

y-INTERCEPT

4. (4 points) A rancher has 800 feet of fencing to put around a rectangular field and then subdivide the field into 2 identical smaller rectangular plots by placing a fence parallel to one of the field's shorter sides. Find the dimensions that maximize the enclosed area. Write your answers as fractions reduced to lowest terms. (You must show all work for full credit.)



$3w + 2\ell = 800$

$3w = 800 - 2\ell$

$w = \frac{800 - 2\ell}{3}$

$\text{AREA} = \ell w = \ell\left(\frac{800 - 2\ell}{3}\right)$

INTERCEPTS ARE $\ell = 0$

$\ell = 400$

$\Downarrow$

VERTEX AT $\ell = 200$

$\ell = 200$

$\Downarrow$

$w = \frac{400}{3}$

MAX AREA WHEN

$\ell = 200$ FT

$w = \frac{400}{3}$ FT