

Name:

Quiz # 2

Business Algebra Math 1090 - Section 2. September 24 2008

1. (a) (4pts) Find the equation of the line passing through $(1, 3)$ and $(5, -5)$.
Bring it to the form $y = mx + b$.

The slope of the line through these two points is given by

$$m = \frac{-5 - 3}{5 - 1} = -2.$$

Using the point slope formula, we get

$$y - 3 = -2(x - 1),$$

and so the equation of the line is

$$y = -2x + 5.$$

- (b) (1pt) The equation of this line describes a linear function. Evaluate this function at $x = 2$.

The value of this linear function at $x = 2$ is $y = -2 * 2 + 5 = 1$.

2. A manufacturer wants to produce a new product she calls the PodI. She can sell the PodI for 120 dollars. Her fixed cost for producing the PodI are 300 000 dollars, and it costs her 90 dollars to produce a PodI. Let x denote the number PodIs she produces and sells.

- (a) (1pt) What is her Revenue in terms of x ?

The Revenue is $R(x) = 120x$.

- (b) (1pt) What is her Cost in terms of x ?

The Cost is $C(x) = 300000 + 90x$

- (c) (1pt) What is her Profit in terms of x ?

Her Profit is $P(x) = 30x - 300000$

- (d) (2pt) How many PodIs does she have to sell to break even?

She breaks even if $P(x) = 0$, i.e., $30x - 300000 = 0$. Hence she breaks even if she produces and sells 10 000 PodIs.

3. Solve the following systems of linear equations.

(a) (2pts)

$$\begin{aligned}x + 3y &= 5 \\x + 2y &= 4\end{aligned}$$

Subtracting the second equation from the first equation, we get

$$y = 1.$$

Plugging this back into the second equation, we obtain $x + 2 = 4$, i.e., $x = 2$. Hence the solution to this system of linear equations is $(2, 1)$.

(b) (3pts)

$$\begin{aligned}2x + 6y &= 46 \\3x - 3y &= -15\end{aligned}$$

Multiplying the first equation by 3, and the second equation by -2, we get an equivalent system of equations

$$\begin{aligned}6x + 18y &= 138 \\-6x + 6y &= 30.\end{aligned}$$

Now we can eliminate the x -variable by adding the two equations, and we end up with

$$24y = 168.$$

Hence $y = 7$. Plugging this back into the original second equation, we obtain that $3x - 21 = -15$, i.e., $x = 2$. Hence the solution to this system of linear equations is $(2, 7)$.