MATH 100 SOLUTIONS: QUIZ III 10 OCTOBER 2019

I *[4 pts each]* Write each of the following in the slope-intercept form.

(a) 8x + 4y = 99

Solution:

$$4y = 99 - 8x$$

$$y = \frac{99}{4} - \frac{8}{4}x$$

$$\boldsymbol{y = -2x + \frac{99}{4}}$$

(b) y – 9 = 3(x – 5)

Solution:

$$y - 9 = 3x - 15$$

$$\boldsymbol{y = 3x - 6}$$

(c) 4(x – y) – 3 (x + y +1) = 5 + 8y

Solution:

$$4x - 4y - 3x - 3y - 3 = 5 + 8y$$

$$x - 7y - 3 - 3 = 5 + 8y$$

$$x - 7y - 3 - 3 = 5 + 8y$$

$$x - 3 = 5 + 15y$$

$$x - 8 = 15y$$

$$15y = x - 8$$

$$\boldsymbol{y = \frac{1}{15}x - \frac{8}{15}}$$

II *[4 pts each]* Find the equation of a line that passes through (7, 11) and is *parallel* to the line

y = -3x + 111.

Express your answer in any form you wish.

Solution:

The given line has slope -3; hence, the parallel line must have slope -3.

Since we are given a point on the new line, we may use the point-slope form:

$$\boldsymbol{y - 11 = -3(x - 7)}$$

III *[4 pts each]* Solve the following system of linear equations using Gauss' method (that is, by elimination).

4x – 3y = 11

7x + 2y = 41

Solution:

To solve for x, we multiply the first equation by 2 and the second equation by 3 to obtain:

8x – 6y = 22

21x + 6y = 123

Next, adding the two equations (i.e., adding the left-hand sides, and the right-hand sides), we find:

29x = 145

Hence $x = \frac{145}{29} = 5$.

Substituting x = 5 into the first original equation:

$$4(5) - 3y = 11$$

$$20 - 3y = 11$$

$$-3y = -9$$

$$y = 3$$

Thus the final answer is **x = 5 and y = 3**. (This solution is easy to check by plugging these numbers into the original two equations.)

IV When the carnival comes to town, a group of students wants to attend. The cost of admission and going on 3 rides is $12.50, while the cost of admission and going on 6 rides is $17.

(a) *[4 pts]* How much does it cost to go on only one ride?

What if any assumptions have you made?

Solution: Since the cost of admission and 3 rides is $12.50, and the cost of three more rides is 17.00 – 12.50 = $ 4.50

Thus the cost of each ride is $ $\frac{4.50}{3} = \mathbf{\$\ 1.50}$

Here we are assuming the cost depends linearly on the number of rides; that is**, all rides are of equal cost.**

(b) *[2 pts]* Write a linear function to represent the cost C(n) of entering the carnival and going on n rides.

Solution:

Since the cost of admission plus 3 rides is 12.50, and each ride costs 1.50, it follows that the cost of admission is 12.50 – 3(1.50) = $ 8.00

Hence the cost, C(n), of admission and n rides is:

$$\mathbf{C(n) = 8.00 + 1.5\ n}.$$

(c) *[2 pts]* Express this function in slope-intercept form.

Solution:

Slope-intercept form: **C = 1.5n + 8**