Name:_____

MATH 1090-8: QUIZ 2

no calculators allowed!

September 6, 2007

1. (4 points) Write the equation of the line through $(-3, -7)$ that is perpendicular to $3x + 2y = 11$.

Solution. The line $3x + 2y = 11$ in slope-intercept form is given by $y = -\frac{3}{2}x + \frac{11}{2}$, so its slope is $-\frac{3}{2}$. The slope of the line perpendicular to it has slope equal to the negative-reciprocal of $-\frac{3}{2}$ or, in other words $\frac{2}{3}$. Thus the line we seek passes through $(-3, -7)$ and has slope $\frac{2}{3}$. Using the point-slope form, we may write its equation as

$$(y - (-7)) = \frac{2}{3}(x - (-3))$$

or

$$y + 7 = \frac{2}{3}(x + 3)$$

or

$$y = \frac{2}{3}x - 5.$$

2. (3 points) An electric utility company determines the monthly bill for a residential customer by adding an energy charge of 8.2 cents per kilowatt-hour to its base charge of \$4.95 per month. Write an equation for the monthly charge y in terms of the x, the number of kilowatt-hours used.

Solution. $y = 4.95 + 0.082x$.

3. (3 points) Solve the following system of equations:

$$2x - y = 2$$
$$2x + 4y = 22.$$

Solution. If we subtract the equations, we get

$$-5y = -20,$$

and so $y = 4$. Plugging this back into the first equation, we get

$$2x - 4 = 2$$

or

$$2x = 6,$$

and so

$$x = 3.$$