Sections 2.3 & 2.4 - Equations of Lines

In class work : Solve each problem.

Exercise #1   Complete the following ordered pairs to make solutions to the equation
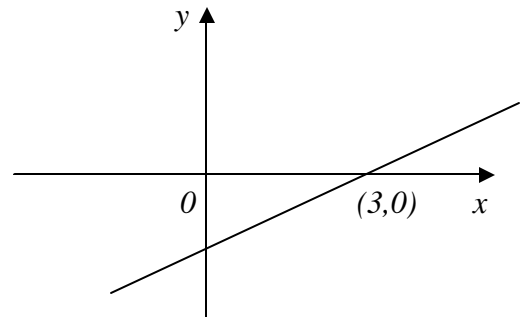$x + 2y = 8$: $(0,?),(?,0)\left(-\frac{4}{3},?\right)$

Exercise #2   Complete the table for the equation $y = \dfrac{2}{3}x$:

x	y
0	
	2
-1	
	3/2

Exercise #3   The graph of $2x - 3y = 6$ is given .

   a) Is $(0,0)$ a solution?

   b) Is $(3,0)$ a solution?

   c) Is *(-2,1)* a solution?
   Prove algebraically and graphically.

Exercise #4   An equation for the concentration of toxic chemicals is $C = 285 - 15t$, where C is
the concentration in part per milliliter (ppm), and *t* is the number of years from
now.
a) Find the intercepts of the graph and graph the equation using the intercepts.
b) What is the significance of the intercepts ?

Exercise #5   A computer store budgets $12,000 to buy computers and laser printers. Each
computer costs $650 and each printer costs $200.
a) Write an equation that models the given situation.
b) Sketch the graph. Be sure to label the axes clearly.
c) What is the significance of the intercepts?
d) If the store buys 4 computers, how many printers can they buy?

Exercise #6   What is the equation of the
a) horizontal line that passes through (2,3) ?
b) vertical line that passes through (4,-3) ?
c) *x*-axis?
d) *y*-axis?

Exercise #7   The weight (in kilograms) of a pumpkin is measured as it grows over a particular
month. After 2 days, the pumpkin weighed 3 kilograms while at 31 days, the
pumpkin's weight was 9 kilograms.
   a. Assuming the weight is growing at a linear rate, find a formula that gives the weight
   "W" (in kilograms) in terms of the number of days "D
   b. What are the units of the slope and what does it mean in this problem.

Exercise #8   Match the graphs (I) – (VI) with the equations given below. (You shouldn't need to graph each equation to determine which is which!) NOTE: The x and y scales may be unequal. Show all work.
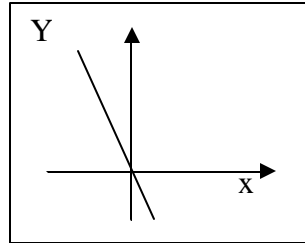
a. $y = .005x + .009$ b. $x = -\boldsymbol{p}\,y$ c. $y = \dfrac{5}{2} - \dfrac{3}{4}x$ d. $x - \sqrt{1000} = 0$ e. $3x + 4y + 10 = 0$

f. $y = 351x - 140$
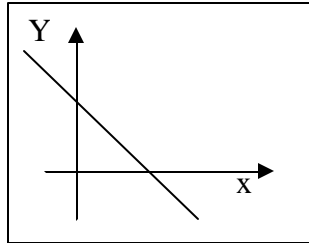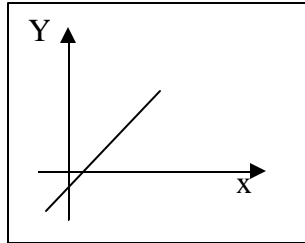
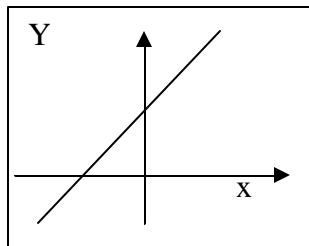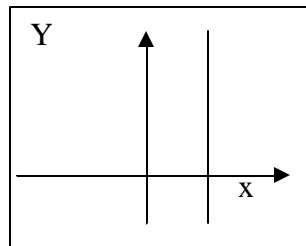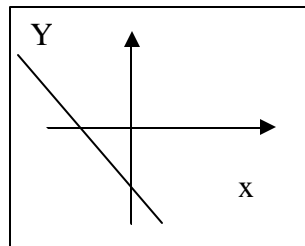|		
(I)	(II)	(III)

(IV)	(V)	(VI)

Exercise #9   At a University, campus food services decides to sell gourmet coffee from a cart in front of the library. The table below is a projection of the cost to the university of selling various amounts of coffee.

Total cost to serve x cups of coffee in a day

| x (cups)	0	5	10	50	100	200
C (dollars	50.00	51.25	52.50	62.50	75.00	100.00

a) Using the table, show that the relationship is linear.
b) Plot the data found in the table.
c) Find the slope of the line. Explain what this means in the context of the given situation.
d) What will it cost to serve 13 cups of coffee in a day?

Exercise #10   Are the lines given by these equations parallel, perpendicular or neither?

$$y - \frac{2}{3}x = 0;\ \ 3y = 2x + 1.$$

Exercise #11   Find an equation of the line that passes through the point (-1,2) and is perpendicular to $\dfrac{5}{18}x + \dfrac{1}{6}y = \dfrac{2}{3}$.

Exercise #12   Find the equation of the solid line graphed below.
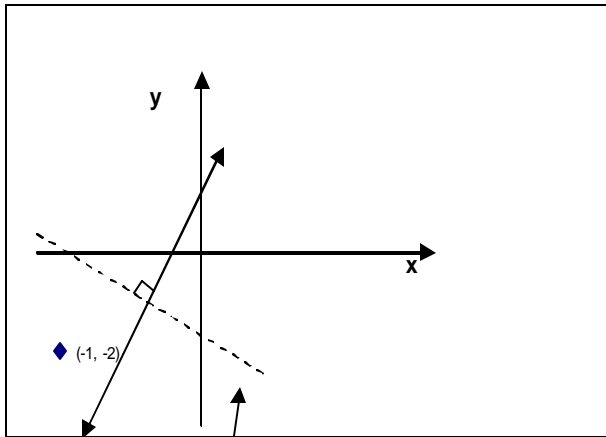
$$\frac{1}{2}x+\frac{5}{4}y+2=0$$

Exercise #13 Which one of the following is true?
   a) A linear function with nonnegative slope has a graph that rises from left to right.
   b) Every line has an equation that can be expressed in slope-intercept form.
   c) The graph of the linear function 5x+6y=30 is a line passing through the point (6,0) with slope -5/6.
   d) The graph of x=7 in the rectangular coordinate system is the single point (7,0).

Exercise #14 Write the slope-intercept equation of a function f whose graph passes through (-5,6) and is perpendicular to the line that has an x-intercept of 3 and a y-intercept of -9.

Exercise #15 Find a function that models the given description. Describe what each variable represents.

(a) In 1998, there were 84 million Internet users in the United States and this number has increased at a rate of 21 million users per year since then.

(b) In 1996, 1.7% of U.S. taxpayers were audited by the IRS and this percentage has decreased at a rate of 0.28% per year since then.