EXAM 1 - MATH 111 Friday, February 6

YOUR NAME:_____ George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Write an equation for the line that passes through $(2, -7)$ and is perpendicular to the line with equation $2x - 3y = 18$.

2. Personal expenditures for higher education rose from 34.7 billion dollars in 1990 to 135 billion dollars in 2008.

   (a) Find the average rate of change of expenditures between 1990 and 2008.

   (b) Find a linear model for the personal expenditures as a function of the year since 1990.

   (c) When are personal expenditures projected to reach a quarter of a trillion dollars according to your model?

3. Solve the following equation manually showing all you steps and leave your answer in fraction (not decimal) form:

$$\frac{2x-3}{4}+\frac{1}{7}=\frac{1-5x}{2}.$$

4. The interest earned at 9% simple interest is directly proportional to the number of years the money is invested.

   (a) If the interest is \$4903.65 in 5 years, write a model for the interest earned as a function of the number of years of the investment.

   (b) Use the model to find in how many years the interest earned at 9% will be \$7845.84.

5. In recent years Hollywood has placed more emphasis on online ads:

Year	2006	2007	2008	2009	2010	2011
Spending (in millions)	259	370	508	650	760	857

(a) Write the linear equation that models online ad spending as a function of the number of years after 2000.

(b) According to this model, what is the annual increase in the amount of online spending?

(c) According to the model what is the percent increase in the amount of online spending from 2009 to 2010?

(d) What was the actual average rate of change of spending from 2006 to 2011?