M1030 Math 1030 Departmental Final Examination Spring 2008

Name: _____

Instructor's Name:_____ Section: _____

Instructions: Please note that there are two parts. Part I is worth a total of 28 points. Part II is worth 72 points. Show your work on each question.

The formulas below are provided for your convenience

Savings Plan: $$A = PMT \frac{\left[\left(1+\frac{APR}{n}\right)^{(nY)} - 1\right]}{\left(\frac{APR}{n}\right)}$$

Loan: $$PMT = \frac{P \times \left(\frac{APR}{n}\right)}{\left[1-\left(1+\frac{APR}{n}\right)^{(-nY)}\right]}$$

PART I score: _____

PART II score:_____

Final Examination Score: _____

Part I: (28 pts) There are seven questions and each question is worth 4 points.

1. You plan to travel to Europe and you are practicing how to deal with different measurement systems. Consider the following situation.
Once you arrive in Rome you would like to take a 250 kilometer trip. The car that you would rent uses 0.14 liters of gas per each mile traveled and you find on the Internet that the price of gas is 1.52 dollars per liter. How much in Euros would you spend for gas on this trip? (1 mile is 1.6093 kilometers, 1 Euro is 1.485 dollars)

Answer _____

2. House prices increase 15% one year, and decrease 10% the next year. How much (in % terms) did the house prices change over the 2 year period?

Answer_____

3. Simplify the following expression: $\dfrac{y^4}{\left(x^{-3}y\right)^5} \cdot \dfrac{x^{-2}}{y^3}$

Answer _____

4. You will deposit $5,000 now into and account with an APR of 2.7% compounded monthly? What will the balance on the account be twenty years from now assuming no withdrawals and no further deposits are made?

Answer_____

5. Solve for t: $\frac{5-4t}{3} = \frac{t}{4}$

Answer _____

6. Find the slope of the line, x and y intercepts: 7x + 4y = 10

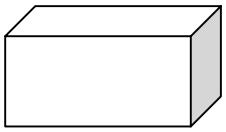
Slope _____

x-intercept _____

y-intercept _____

7. The shape below with the given dimensions is a scale model of a box. The model will be scaled up so that the box will have a length of 25 cm. What is the surface area and the volume of the new box?

Model



length = 3 cm
surface area = 135.75 cm^2
volume = 97.875 cm^3

Surface area of box_____

Volume of box _____

Part II (72 pts): There are 6 questions and each question is worth 12 points.

1. Two cylindrical cans of soup sell for the same price. Can A has a diameter of 12 cm and a height of 10 cm. Can B has a diameter of 5 inches and a height of 6 inches. Which can contains more soup and, therefore, is a better buy? (1 inch is 2.54 cm)

Answer _____

2. The diameter of a tree increases by 0.5 inch every 3 years. When you started observing the tree, its diameter was 5 inches.

a) Write a linear equation that describes this situation.

Answer _____

b) When will the tree have a diameter of 16 inches?

Answer _____

3.The number of cells in a tumor doubles every 1.5 months.
a) How long will it take for the number of cells to triple?

Answer _____

b) If the tumor begins with a single cell, how many cells will there be after 3 years?

Answer _____

4. You take 400 mg of a certain medication at 10 am. The medication is eliminated from your bloodstream exponentially at a rate of 12% per hour.
a) How much of this medication is in your bloodstream at 8 pm the same day?

Answer _____

b) What is the exact half-life of that medication in your bloodstream?

Answer _____

5. A savings account pays an annual percentage rate of 2.75% compounded quarterly.
a) Find the annual percentage yield on this account.

Answer _____

b) You decide that you would like to make a regular quarterly deposits to this account since you would like to have $600,000 when you retire in 40 years. How much should your deposit quarterly in order to accomplish your goal?

Answer _____

6. A survey of 210 students at a nonresidential college was taken to determine how they got to campus during the fall term. Of those surveyed, 118 used cars, 82 used public transportation, and 55 used bikes. 28 students used cars and public transportation only, 20 used cars and bikes only, and 26 used public transportation only. 12 students used all three modes of transportation.
a) Draw a Venn diagram to illustrate this information. Use the symbols PT, C, B to represent the set of students who used public transportation, cars, or bikes, respectively.

b) Use your diagram to answer the following:

How many students used only cars to get to campus?

Answer _____

How many students did not use any of the three modes of transportation to get to campus?

Answer _____