Homework Assignment 6: Due at the beginning of class 10/3/01

Figure 1: The Troll-II oil and natural gas platform located in the North Sea.

The Troll-II oil platform (see Figure 1[1]) began producing oil in 1996. The Troll-II oil field is now one of Norway's largest, accounting for approximately 10% of Norway's annual petroleum production. The platform is the largest concrete structure of its kind - certainly the largest concrete structure ever moved[2]. Questions 1 and 2 refer to the information contained in Table 1 and Figure 2.

In Questions 1 and 2 you will investigate the function that gives the total amount of petroleum produced by the Troll-II platform since January 1, 2000.

Date	Production Rate
1/1/2000	46.105
2/1/2000	49.785
3/1/2000	46.246
4/1/2000	49.633
5/1/2000	49.024
6/1/2000	49.658
7/1/2000	51.953
8/1/2000	51.438
9/1/2000	48.178
10/1/2000	51.955
11/1/2000	52.875
12/1/2000	48.532

Table 1: Production data for the Troll-II oil field. (Source: Norwegian Petroleum Directorate, www.npd.no)

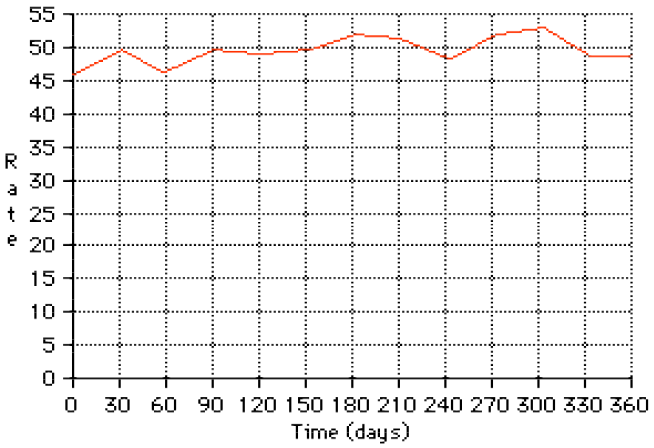

Figure 2: Graph showing rate of petroleum production from the Troll-II field during 2000. (**NOTE:** Rate is measured in thousands of cubic meters of petroleum per day.)

1. Over which time intervals (during the year 2000) was this function increasing and over which intervals was it decreasing? Over which time intervals was the function concave up and over which time intervals was it concave down? In each case, briefly state what features of Table 1 or Figure 2 you were looking for.

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[1] Image source: http://www.npo.no

[2] Source: http://www.discovery.com

2. Sketch a graph of this function versus time. Use your graph to estimate the total amount of petroleum produced by the Troll-II platform during 2000.

In the last twenty years, tuition and fee costs at four year colleges have continued to rise. Table 2 (below) shows the average yearly tuition costs for private and public colleges from 1971 to 1999[3].

Academic Year	Tuition - Private (Dollars)	Tuition - Public (Dollars)
1971-1972	1820	376
1980-1981	3617	804
1984-1985	5556	1228
1989-1990	8663	1696
1998-1999	14508	3243

Table 2: Average Cost of Tuition and Fees, 4-Year Colleges.

Questions 3, 4 and 5 refer to the data contained in Table 2.

3. Find an equation (from the choice of linear, exponential or power) that does the best job of representing the cost of tuition at a private university as a function of time. Describe the criteria you used to decide which is best.

4. Find an equation (from the choice of linear, exponential or power) that does the best job of representing the cost of tuition at a public university as a function of time. Describe the criteria you used to decide which is best.

5. Calculate the total cost of tuition for students in the following situations:

Student A: Plans to attend a private university starting in Fall 2000 and graduate in four years.

Student B: Plans to attend a public university starting in Fall 2025 and graduate in four years.

Student C: Plans to attend a private university starting in Fall 2025 and graduate in four years.

As part of your answer, supply a clear, one-paragraph description of why you believe that the calculations that you have performed solve this problem.

[3] Source: *The College Board*, 2000.