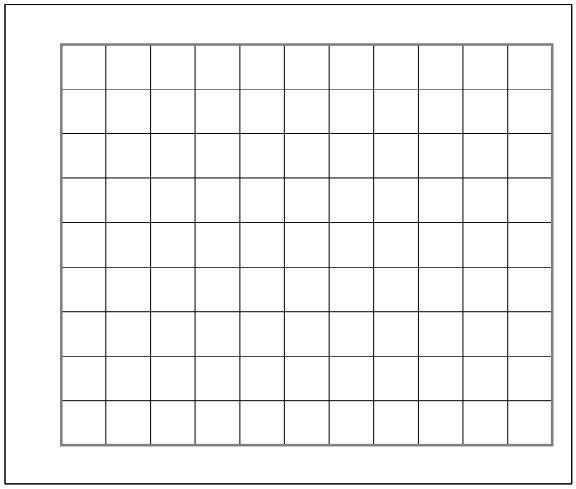
MATH 230 Name_____
Test #3 Spring 2004

1. (8 points) Consider the relationship expressed in the table below.

P	Q
1	2
3	10
5	18
7	26
9	34



a. Plot the data points using the grid above. Draw and appropriately label the axes. Indicate the scale used on each axis.

b. Use the space below to show how to determine a functional equation for the relationship.

2. (8 points) Consider the relationship expressed in the table below. Assume the observed pattern of differences continues indefinitely.

n	0	1	2	3	4	5	6	7	8
B_n		6	16	32	54	82	116		

a. Complete the table by entering the values for B_0, B_7 and B_8.

b. Complete the following rule that specifies a difference equation for this relationship.

B_0 = _____

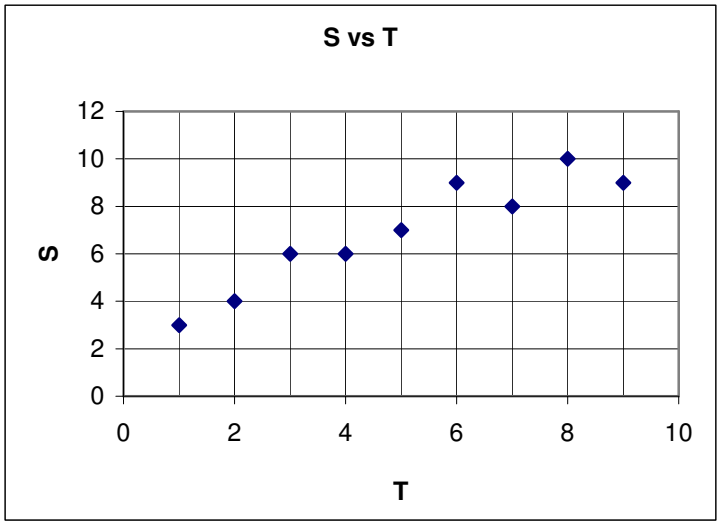
$B_n = B_{n-1}$ + _____

c. Complete the following rule to specify an explicit functional equation for this relationship. Use the space below to explain how you determined the functional equation.

B_n = _____.

3. (8 points) Some data and an associated graph are provided below. Sketch a line that approximately fits the data, and show how to determine an equation for your good fit line. Use your equation equation to estimate a predicted value for y when x is 10. Use a numerical criterion for goodness of fit and comment on how well you think your line fits the data.

P	Q
1	3
2	4
3	6
4	6
5	7
6	9
7	8
8	10
9	9



4. (8 points) Suppose 100 flies are placed in a very large glass cage with pleny of food and air. Aussme that the number of flies in the cage grows by 9% per day.

Let F_0 = initial nuber of flies in the cage, and
let F_n = the number of flies in the cage after n days.

a. Show how to calculate F_1 and F_2.

b. Write a difference equation for this relationship.

c. Write a functional equation for this relationship.

d. Show how determine the number of days it will take for the number of flies in the cage to exceed 180.

5. (8 points) A weather balloon carries a battery-powered radio transmitter which sends weather data back to the ground. When the ballon is sent up, the battery carries a charge of 30 units. The transmitter uses up 2.5 units of charge per hour.

a. How many units of charge will the battery retain after one hour?

How many units of charge will the battery retain after two hours?

How many units of charge will the battery retain after three hours?

b. Write a difference equation to determine the units of charge the battery will retain after n hours. (Be sure to justify your reasoning and identify any variables you introduce.)

c. Write a functional equation to determine the units of charge the battery will retain after h hours. (Be sure to justify your reasoning and identify any variables you introduce.)

d. The radio transmitter cannot continue to work once the charge on the battery falls below 4 units. Show how to use your functional equation to determine the number of hours it will take for the transmitter to stop working.