MAP4CI Unit 5 Lesson 6          **Worksheet: Exponential Models**

1.  According to a historical account, a servant asks to be rewarded by receiving one grain of rice for the first square of a checkerboard, two grains for the second square, four grains for the third square; the amount doubles with each square on the checkerboard.

a) How many grains of rice would the servant receive for the tenth square of the checkerboard?

b)  Explain why an exponential model can be used for the relationship between the square on the checkerboard and the number of grains of rice.

2.  Does each number sequence represent exponential growth? Explain.

a) 10, 100, 1000, 10000

b) 3, 6, 9, 12

c) ¼, ½ , 1, 2, 4

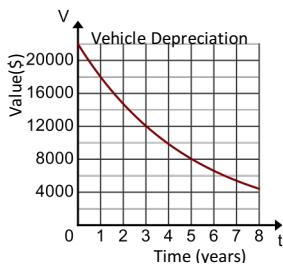3.  Calculate the finite differences and the ratios. Is each relation linear, quadratic or exponential?

a)

| x | y | First Differences | Second Differences | Ratios |
|---|---|---|---|---|
| -3 | -64 | | | |
| -2 | -16 | | | |
| -1 | -4 | | | |
| 0 | -1 | | | |
| 1 | -1/4 | | | |
| 2 | -1/16 | | | |

b)

| x | y | First Differences | Second Differences | Ratios |
|---|---|---|---|---|
| -2 | 6.0 | | | |
| -1 | 4.9 | | | |
| 0 | 3.8 | | | |
| 1 | 2.7 | | | |
| 2 | 1.6 | | | |
| 3 | 0.5 | | | |

4.  The graph shows the value of the vehicle over time.



a) Describe the relationship between time and the value of the vehicle.

b) Estimate the value of the vehicle after 4 years.

c) Describe the rate of change of the value of the vehicle with respect to time.

d) What are suitable units for the rate of change of the value of the vehicle with respect to time?

e) Is the rate of change of the value of the vehicle with respect to time increasing, constant, or decreasing? Explain.