



SHENTON
COLLEGE

Mathematics Methods Year 11 2016 Test 4

NAME: _____

Teacher (circle one): Friday Mackenzie McRae

Section 2: Calculator (1 page of notes, 1 side; formula sheet given) (25 minutes, 27 marks)

Question 1. [2, 2, 3 & 2 = 9 marks]

Two sequences A and T are defined below.

$$T_n = 100 - 2n$$

$$A_n = 0.8A_{n-1} \quad A_3 = 4$$

- (a) Find the first 4 terms of both sequences.
- (b) Write a recursive definition for T_n .
- (c) One of the series, of the sequences above, tends towards a certain value. What is this value and explain why it does this?
- (d) Calculate the sum of the terms T_{40} to T_{60} , inclusive.

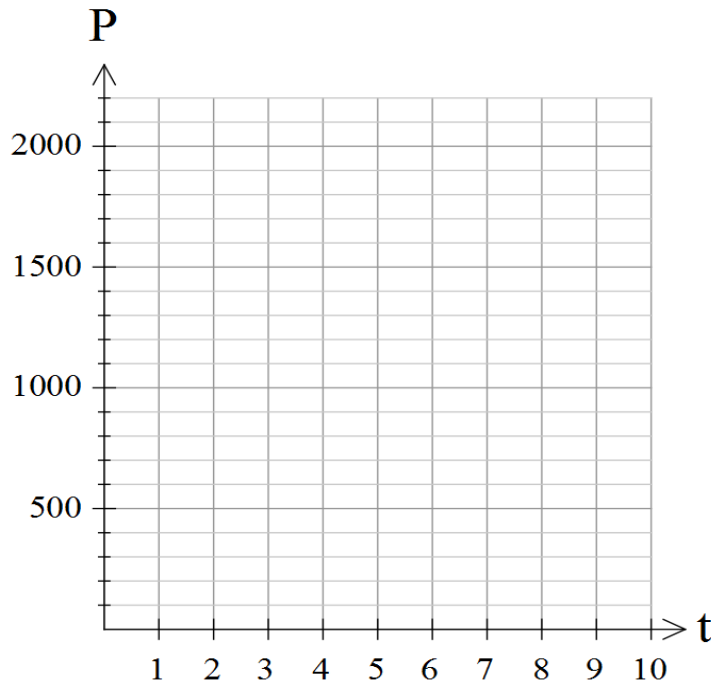
Question 2. [2, 2, 2, 2, 2 = 10 marks]

The population of Llamas in a South American reserve is slowly dwindling due to new management. After 3 years the population of Llamas is 1244 and two years later the population is 876. If the population is declining at an exponential rate

- a) What percentage of Llamas are they losing per year (to 1 d.p.)?

- b) How many Llamas were there when the new management took over?

- c) Use the grid below to draw a graph of the population of Llamas after new management took over, for $0 \leq t \leq 6$, where t is the time in years.



- d) Write a general rule for describing the population (P), in terms of years (t), of the Llamas after new management began.

- e) After 6 years the current management is fired and a breeding program is developed that promises that numbers will be back up to the original level in 4 years' time. What percentage growth rate must they have promised?

Question 3. [2, 2 = 4 marks]

On the 1st January 2001 John opens an account for his new born baby boy with a deposit of \$2000 in an account that accrues interest at 3.8% compounded annually. On the same day each year he puts in another \$1000 into the account. If the interest rate stays the same for the time he has the account,

- a) Write a recursive rule that describes this investment.
- b) How much will he have in the account if he closes the account after 12 years, just before he makes his annual January deposit?

Question 4. [4 marks]

For the geometric series $40 + 24 + 14.4 + \dots$ find the least value of n so that the difference between S_∞ and S_n is less than 0.2.