

# 2014 Further Mathematics Written examination 2 solutions

## Module 1: Number patterns

### Question 1

- a.  $L_{2014} = 20000 \text{ km}^2$
- b. 1%
- c.  $L_{2015} = 0.99 \times 20000 = 19800 \text{ km}^2$  as required
- d. 1% of 19800 = 198  $\text{km}^2$

### Question 2

- a.  $\frac{0.68}{0.8} = \frac{0.578}{0.68} = 0.85$
- b.  $t^6 = ar^5 = 0.8 \times 0.85^5 = 0.35 \text{ km}^2$
- c.  $S_5 = \frac{0.8(1-0.85^5)}{1-0.85} = 2.97 \text{ km}^2$
- d.

A	n	B	s	C
=				=0.8*(1-(0.85)^n)/(1-0.85)
5	5.			2.966905
6	6.			3.32186925
7	7.			3.6235888625
8	8.			3.88005053313
9	9.			4.09804295316

year 2022

### Question 3

- a.  $H_{2015} = 0.85 \times 14000 + 500 = 12400 \text{ km}^2$  as required
- b.  $E_{2015} = 1.06 \times 5000 = 5300$   
 $E_{2016} = 1.06 \times 5300 = 5618$   
 $H_{2016} = 0.85 \times 12400 + 500 = 11040$   
 $\text{km}^2 / \text{elephant} = \frac{11040}{5618} = 1.97 < 2$   
 $\therefore$  overpopulated
- c. 6% of 5000 = 300
- d. 400
- e.  $\frac{11040}{2} = 5520$  elephants is the maximum number to avoid overpopulation in 2016  
Require  $k$  so that  $1.06(1.06 \times 5000 - k) - k = 5520$   
 $k = 47.6$   
So the minimum number of elephants that should be moved at the end of each year is 48.