

# 2019 VCE Further Mathematics 1 (NHT) examination report

## Specific information

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

The tables below indicate the correct answer for each question.

### Section A – Core

#### Data analysis

Question	Answer
1	E
2	D
3	D
4	E
5	C
6	B
7	E
8	E
9	B
10	B
11	C
12	D
13	A
14	D
15	B
16	E

#### Question 2

The number of babies with a *birth weight* between 3000 g and 3500 g is closest to 37% of 200, which equals 74 (option D).

**Question 12**

All five options needed to be considered.

- Option A was incorrect as the correlation coefficient cannot be greater than 1.
- Option B was incorrect as a correlation coefficient would not be calculated as one of the variables is ordinal.
- Option C was incorrect as a correlation coefficient would not be calculated as both of the variables are ordinal.
- Option D was correct.
- Option E was incorrect as the coefficient of determination cannot be negative.

**Recursion and financial modelling**

Question	Answer
17	D
18	A
19	B
20	C
21	C
22	A
23	B
24	A

**Question 23**

The future value of the loan after eight months, using a finance solver is \$8426.29613.

After 10 monthly payments of \$850, Armand owes \$168.28, to the nearest cent.

The final repayment must include interest on this balance.

Using a finance solver, the final repayment to the nearest cent is \$169.14, and therefore \$169 to the nearest dollar (option B).

**Module 1 – Matrices**

Question	Answer
1	E
2	C
3	B
4	A
5	D
6	D
7	D
8	C

**Question 7**

From the transition diagram, 20% of cows at  $R$  one week will be at  $Q$  the next week.

In week 23 there were 240 cows at  $R$ , so in week 24, 20% of 240 = 48 cows will be at  $Q$ .

In week 24 there will be a total of 222 cows at  $Q$ , so the percentage of these that had been at  $R$  the

previous week is  $\frac{48}{222} \times 100 \approx 22\%$

**Question 8**

Raising the transition matrix to a high power shows that the proportion of sheep at  $S$  in the long term is approximately 0.31296.

$0.31296 \times \text{total sheep} = 635$ , giving a total number of sheep as 2029, to the nearest whole number.

The number expected at  $Q$  each week in the long term is  $0.26027 \times 2029$ , making option C the closest option.

**Module 2 – Networks and decision mathematics**

Question	Answer
1	D
2	D
3	D
4	E
5	B
6	D
7	C
8	B

**Module 3 – Geometry and measurement**

Question	Answer
1	C
2	A
3	E
4	B
5	A
6	C
7	C
8	D

## Module 4 – Graphs and relations

Question	Answer
1	D
2	B
3	C
4	A
5	E
6	A
7	C
8	B

### Question 4

Consider firstly a ratio of two sheep to one cow:

$$y : x$$

$$2 : 1$$

As an equation  $\frac{y}{x} = \frac{2}{1} \Rightarrow y = 2x$

As an inequality 'at least' is represented by  $\geq$ .

Therefore,  $y \geq 2x$ , or equivalently  $x \leq \frac{y}{2}$ , which was option A.

### Question 7

The slope of the sliding line for the objective function  $Z$  is  $-1$ .

Line segments  $AD$  and  $BC$  both have this slope.

As the coefficients of  $x$  and  $y$  in the objective function are both negative, the first of these segments reached by the sliding line gives the maximum.

This can also be obtained by substitution.

For points along  $AD$  the value of the objective function  $Z = -10$ .

For points along  $BC$  the value of the objective function  $Z = -20$ .

The maximum value is  $-10$ ; therefore, option C was correct.