2023 VCE Further Mathematics 2 (NHT) external assessment 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.

Section A – Core

Data analysis

Question 1a.

4

name, gender, longest foot, dominant hand

Question 1b.

mean = 24.8 cm

standard deviation = 0.9 cm

Question 1c.

29%

Question 1d.

|  |  |  |
| --- | --- | --- |
|  | Dominant hand | |
| Longest foot | Left | Right |
| Left | 1 | 5 |
| Right | 2 | 2 |

Question 1e.

foot width = 1.53 + 0.306  foot length

Question 2a.

7.9 cm

Question 2b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Min | Q1 | Median | Q3 | Max |
| 8.0 or 8.4 | 8.85 | 9.15 | 9.65 | 9.8 |

Question 2c.

Yes, as the median foot width of the boys, 9.15 cm, is greater than the median foot width of the girls, 8.8 cm.

OR

No, as the Interquartile range for boys and girls are both equal to 0.8.

Question 3

Upper fence = 25.1 + 1.5(25.1 – 23.6)

= 27.35 cm

27.5 cm lies above the upper fence, making it an outlier.

Question 4a.

**A graph with a line and a blue line

Description automatically generated**

End points at (21, 8.0679) and (28, 9.8032)

Question 4b.

Foot width = 2.862 + 0.2479 × 27.8

= 9.75362 ≈ 9.8

Question 4c.

Extrapolation

Question 4d.

On average, foot width increases by 0.2479 cm for each 1 cm increase in foot length.

Question 4e.

*r*  = 0.64066… ≈ 0.641

Question 4f.

58.9%

Question 4g.

Yes, as residual plot shows no clear pattern (orresiduals are randomly scattered).

Question 5ai.

30

Question 5aii.

2.5

Question 5b.

mean = 27 cm

standard deviation = 1.5 cm

Recursion and financial modelling

Question 6a.

The monthly repayment

Question 6b.

V1 = 1.00275×650 000 – 3184.75 = $648 602.75

V2=1.00275×648 602.75–3184.75= $647 201.66

Question 6c.

(1.00275 – 1) × 12 × 100 = 3.3%

Question 6di.

$391 008.50

Question 6dii.

Repayment is constant, but less interest is charged each month as the balance decreases.

Question 7a.

$28 900

Question 7b.

15%

Question 7c.

Year 9 (or 2027)

Question 7d.

V0 = 40 000, Vn+1 = 0.85 × Vn

Question 8a.

$476 484.76

Question 8bi.

$211 505.50

Question 8bii.

R0 = 480 094.50, Rn+1 = 1.00075 × Rn – 665

Section B – Modules

Module 1 – Matrices

Question 1a.

a = 8

b = 1

Question 1b.

The difference in the cost of hiring a coach for eight hours compared to hiring a coach for one day.

Question 1c.

0.8

Question 2a.

No driver upgrades from a light-rigid licence one year to a heavy-rigid licence the next year.

Question 2b.

Diagram

Description automatically generated

Question 2c.

6

Question 2d.

4

Question 3a.

Tuesday and Friday

Question 3b.

Wednesday, Thursday and Friday

Question 3c.

***P =*** 

Question 3d.

Weekday hourly rate = $26

Weekend hourly rate = $38

Module 2 – Networks and decision mathematics

Question 1a.

9

Question 1b.

P and T

Question 1c.

855 m

*dam–T–R–G–L–P–T–dam* (or reverse)

Question 1d.

**A grid of numbers and letters

Description automatically generated**

Question 2ai.

Chart, radar chart

Description automatically generated

Question 2aii.

minimum spanning tree

Question 3a.

24

Question 3b.

8

Question 3c.

*C* and *J*

Question 3d.

4 days

Question 3e.

$1900

Reduce *A* by one day, *B* by two days and *K* by two days.

Module 3 – Geometry and measurement

Question 1a.

6044cm3

Question 1bi.

10.3cm

Question 1bii.

1.21

Question 2a.

570.35 m2

Question 2b.

Total line length = 4 × 15.25 + 2 × 30.5 + π × 0.9 + π × 9.8

= 155.615…

Question 2c.

3 tins/cans

Question 3a.



Question 3b.



Question 4a.



Question 4bi.

(360º – 343º) + 18º

= 35º

Question 4bii.

21.4 m

Question 4c.

Yes, as 14.74 < 15.1

Shortest distance = 25.7 × sin 35º = 14.7409… m

Tree is 15.1 m tall

Module 4 – Graphs and relations

Question 1a.

10m

Question 1b.

**8** km/h

Question 2

**A graph with lines and dots

Description automatically generated**

Question 3a.

PC = 15 × n + 65

Question 3b.

**A graph with a line

Description automatically generated**

Question 3c.

7

Question 3d.

13

Question 4a.

A maximum of 55 kites in total may be purchased.

Question 4b.

10

Question 4c.

$4885

Question 4d.

$95

Objective function C = ax + by has same slope as x + *y* = 55 (-1), therefore a = b.