

FURTHER MATHEMATICS

Written examination 1



2016 Trial Examination

SOLUTIONS

SECTION A: Core – Multiple-choice questions (1 mark each)

Core: Data Analysis

Question 1

Answer: C

Explanation:

Use one-variable on CAS.

Question 2

Answer: D

Explanation:

$$\frac{6}{24} \times 100 = 25\%$$

Question 3

Answer: A

Explanation:

All centres of distribution are the same for symmetrical data.

Question 4

Answer: B

Explanation:

$$\frac{16}{100} \times 80 \approx 13$$

Question 5

Answer: E

Explanation:

$$-1.2 = \frac{h-167}{15}$$

Question 6

Answer: D

Explanation:

$$\frac{40}{100} \times 4000 = 1600$$

Question 7

Answer: A

Explanation:

$$56 - 7 = 49$$

Question 8

Answer: A

Explanation:

$$b = -0.641 \times \frac{4079}{50989} \approx -0.05128$$
$$a = 4999 - (-0.05127) \times 61195$$

Question 9

Answer: D

Explanation:

$$r = -\sqrt{0.8276}$$

Question 10

Answer: B

Explanation:

$$\log_{10}(x) = 0.001$$

Question 11

Answer: D

Explanation:

The equation is for the deseasonalised data.

Question 12

Answer: B

Explanation:

$$(2400 + 2.56 \times 7) \times 0.87$$

Question 13

Answer: E

Explanation:

Order the vertical distances to read the median value.

Question 14

Answer: D

Explanation:

On CAS, life expectancy is the response variable.

Question 15

Answer: B

Explanation:

$$85.72 - 0.63 \times 18$$

Question 16

Answer: C

Explanation:

$$\text{solve} \left(-1.5 = \frac{78.7 - 82}{x} \right) \text{ for } x$$

Question 17

Answer: A

Explanation:

Adding \$55 to the previous term to get the new term.

Question 18

Answer: E

Explanation:

$$100\% + 1\% = 101\% = 1.01$$

Question 19

Answer: B

Explanation:

3000, 3000×1.01 , ...

Question 20

Answer: C

Explanation:

$$\frac{r}{1200} = 0.0125$$

Question 21

Answer: D

Explanation:

5000, $5000 \times 1.0125 - 450$, ...

Question 22

Answer: D

Explanation:

$$[(450 \times 12) + 16.61] - 5000$$

Question 23

Answer: B

Explanation:

Finance Solver

N: 300

I(%): 8.7

PV: 450000

PMT: -3684.3719486366

FV: 0.

PpY: 12

Finance Solver info stored into
tvn.n, tvn.i, tvn.pv, tvn.pmt, ...

$$(3684.37 \times 12 \times 25) - 450000$$

Question 24

Answer: D

Explanation:

Value at the end of the second period is \$2388 not \$2400.

SECTION B: Module 1 – Multiple-choice questions (1 mark each)

Question 1

Answer: D

Explanation:

$$18 + 42 + 20 + 28 + 33 = 141.$$

Question 2

Answer: C

Explanation:

Element in the second row and third column.

Question 3

Answer: A

Explanation:

Number of columns in C is not equal to number of rows in D

Question 4

Answer: B

Explanation:

$$\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$$

Question 5

Answer: E

Explanation:

$$AXB = CD \rightarrow AX = CDB^{-1} \rightarrow X = A^{-1}(CDB^{-1})$$

Question 6

Answer: D

Explanation:

$$kP = \begin{bmatrix} 2k & 3k \\ 3k & 7k \end{bmatrix} \rightarrow \text{find the inverse}$$

Question 7

Answer: C

Explanation:

$$T^2 \times S_0$$

Question 8

Answer: A

Explanation:

$$\begin{bmatrix} 0.65 & 0.3 \\ 0.35 & 0.7 \end{bmatrix}^3 \times \begin{bmatrix} 143.925 \\ 146.075 \end{bmatrix}$$

SECTION B: Module 2 – Multiple-choice questions (1 mark each)

Question 1

Answer: C

Explanation:

Vertices D and E.

Question 2

Answer: D

Explanation:

$$5 + f - 9 = 2$$

Question 3

Answer: B

Explanation:

$$2 + 0 + 4 = 6$$

Question 4

Answer: D

Explanation:

B and C do not have any partnership.

Question 5

Answer: E

Explanation:

$$A \rightarrow 3 \text{ (12)}, B \rightarrow 1 \text{ (9)}, C \rightarrow 4 \text{ (4)}$$

Question 6

Answer: D

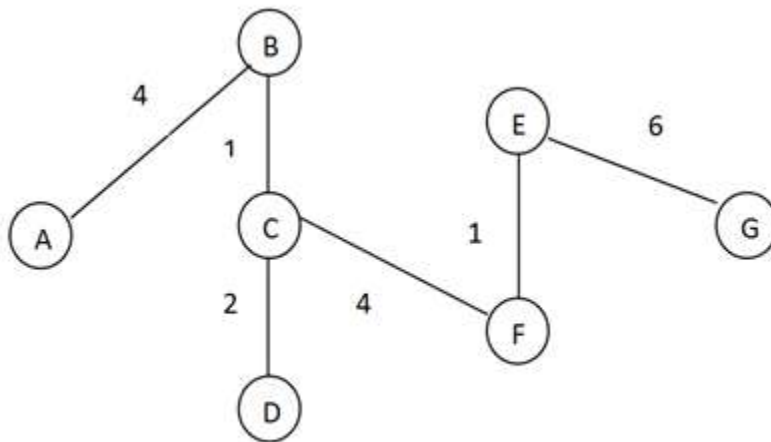
Explanation:

The traveler passes each vertex once.

Question 7

Answer: B

Explanation:



Question 8

Answer: A

Explanation:

$A \rightarrow C \rightarrow F \rightarrow E \rightarrow G$

SECTION B: Module 3 – Multiple-choice questions (1 mark each)

Question 1

Answer: A

Explanation:

$$\frac{1}{2}(48 + 40) \times 15$$

Question 2

Answer: D

Explanation:

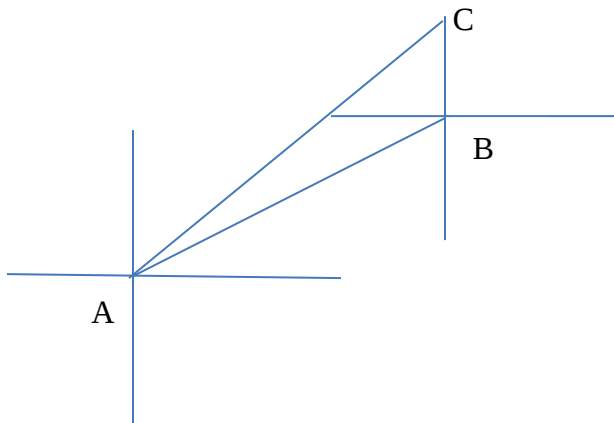
$$\cos(\theta) = \left(\frac{32^2 + 44^2 - 50^2}{2 \times 32 \times 44} \right)$$

Question 3

Answer: A

Explanation:

BA makes an angle of 45 degrees with North, AC makes an angle less than 45 degrees with North



Question 4

Answer: B

Explanation:

$$\left(\frac{b}{a}\right)^3 = 4^3 \rightarrow \frac{b}{a} = 4 \rightarrow b = 4a$$

Question 5

Answer: C

Explanation:

$$l = 2\pi \times 48.$$

Question 6

Answer: B

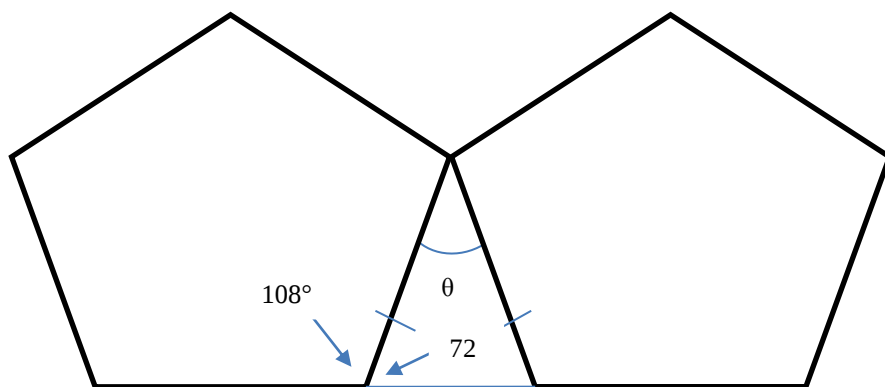
Explanation:

$$\frac{1}{2} \times 10 \times 7 - \pi \times 2.8^2$$

Question 7

Answer: A

Explanation:



Question 8

Answer: D

Explanation:

$$\frac{1}{3} \times \pi \times 3.5^2 \times 6 + \pi \times 3.5^2 \times 10 + \frac{2}{3} \times \pi \times 3.5^3$$

SECTION B: Module 4 – Multiple-choice questions (1 mark each)

Question 1

Answer: B

Explanation:

$$-2 + 10 = 8 \geq 8$$

Question 2

Answer: C

Explanation:

Read the shaded dot carefully.

Question 3

Answer: D

Explanation:

$$y = -\frac{6}{15}x + 6$$

Question 4

Answer: D

Explanation:

$$\text{red cars} \geq 16 + \text{blue cars}$$

Question 5

Answer: A

Explanation:

$$y = kx^2 \rightarrow 4 = k \times 8 \rightarrow k = \frac{1}{2} \rightarrow y = \frac{1}{2} \times x^2 = \frac{1}{2} \times 16 = 8$$

Question 6

Answer: B

Explanation:

$$3000 = 45n - (180 + 18n)$$

Question 7

Answer: C

Explanation:

Find the equation of each line and perform the point test to identify the required region.

Question 8

Answer: D

Explanation:

Find z at each of the corner points.