# FURTHER MATHEMATICS

## Written examination 1

TSSM™
Creating VCE Success

## 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:*

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

**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:*

$3000,\ 3000 \times 1.01, \ldots\ldots$

**Question 20**

*Answer:* C

*Explanation:*

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

**Question 21**

*Answer:* D

*Explanation:*

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

**Question 22**

*Answer:* D

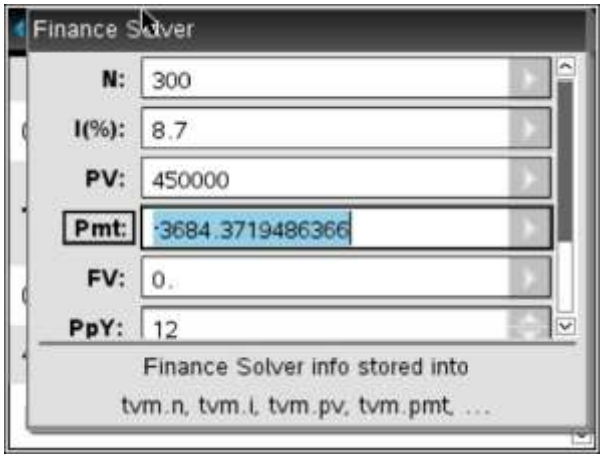
*Explanation:*

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

**Question 23**

*Answer:* B

*Explanation:*




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

**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:*

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

**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:*

$A \to 3\ (12),\ B \to 1(9),\ C \to 4\ (4)$

**Question 6**

*Answer:* D

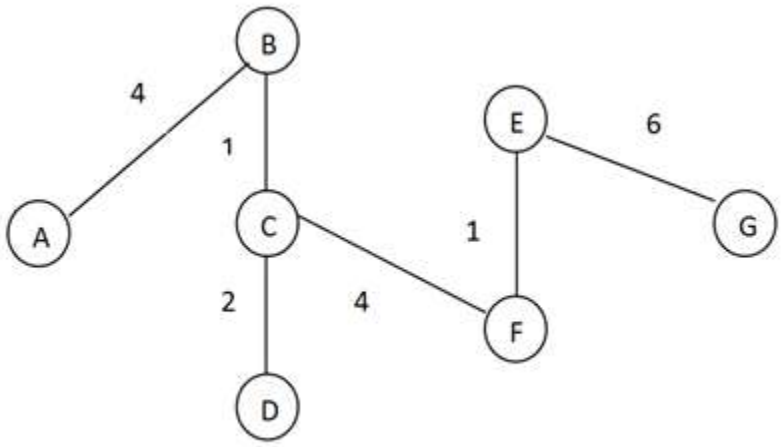
*Explanation:*

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:*

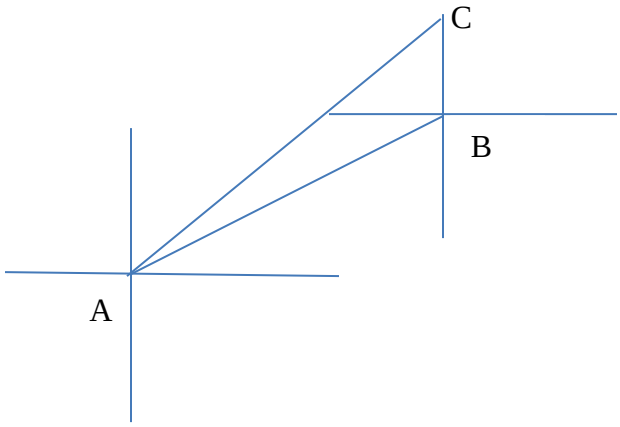
$\cos(\theta) = \left(\frac{32^2+44^2-50^2}{2\times32\times44}\right)$

### 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

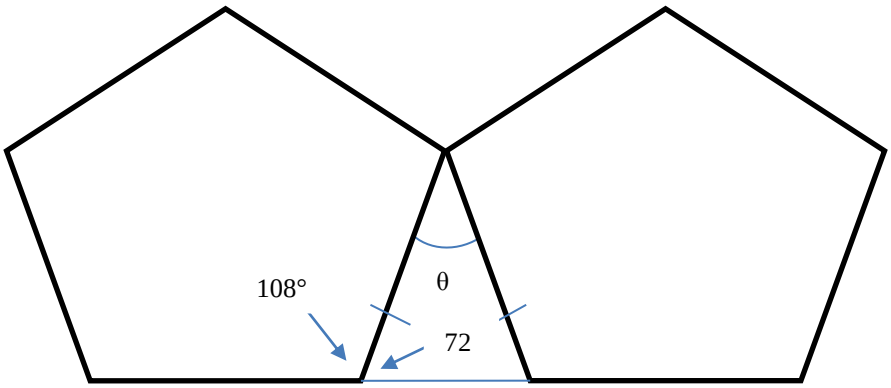
*Explanation:*

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

**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:*

$red\ cars \geq 16 + blue\ cars$

**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.