

**SECTION A Core: Data analysis**

1	2	3	4	5	6	7	8	9	10	11	12	13
D	B	A	E	D	B	D	E	A	A	E	C	D

**SECTION B**

**Module 1: Number patterns and applications**

1	2	3	4	5	6	7	8	9
C	A	B	A	E	E	C	C	D

**Module 2: Geometry and trigonometry**

1	2	3	4	5	6	7	8	9
D	D	E	B	C	A	A	B	C

**Module 3: Graphs and relations**

1	2	3	4	5	6	7	8	9
B	C	A	B	E	D	C	C	D

**Module 4: Business-related mathematics**

1	2	3	4	5	6	7	8	9
B	D	B	E	D	D	B	A	C

**Module 5: Networks and decision mathematics**

1	2	3	4	5	6	7	8	9
C	B	B	A	D	E	C	E	B

**Module 6: Matrices**

1	2	3	4	5	6	7	8	9
A	E	B	D	E	C	D	B	C

**SECTION A Core: Data analysis**

Q1 Read from stem plot. D

Q2  $Q_L = 19, Q_U = 25, IQR = 25 - 19 = 6$  B

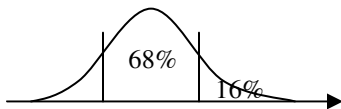
Q3 A

Q4  $12 + 19 + 28 + 5 + 1 = 65$  E

Q5 Modal class is between 6.5 and 7.5. D

Q6 B

Q7 D



$32 = \mu - \sigma, 68\% + 16\% = 84\%$  D

Q8 Read from graph, 86%. E

Q9  $x$ : sleeping time,  $y$ : life span.  
 Graphics calc.  $y = 38.9 - 2.36x$  A

Q10  $r = -0.6603$  A

Q11 For baboon, body weight = 10.55,  
 brain weight =  $49.4 + 2.68 \times 10.55 = 77.674$ .  
 Residual = actual - prediction =  $179.5 - 77.674 \approx 102$  E

Q12 Scatter plot has the form  $y = \log_{10} x$ . C

Q13 Lower median is (1990,0.6), upper median is (1996,3.3).  
 Average increase per year = gradient  $\frac{3.3 - 0.6}{1996 - 1990} = 0.45 = 45\%$  D

**SECTION B**

**Module 1: Number patterns and applications**

Q1  $29 + 47 = 76$  C

Q2  $a = 0.40, d = 0.55 - 0.40 = 0.15,$   
 $t_8 = a + 7d = 0.40 + 7 \times 0.15 = 1.45$  A

Q3  $r = \frac{t_2}{6400} = \frac{-9112.5}{8100}, \therefore t_2 = -7200$  B

Q4  $a = 96, r = \frac{6}{-12} = -0.5. S_\infty = \frac{96}{1 - (-0.5)} = 64$  A

Q5 GP:  $6, 6^2, 6^3, 6^4, 6^5$   
 $S_5 = \frac{6(6^5 - 1)}{6 - 1} = 9330$  E

Q6  $t_n = 100 - 20n, t_1 = 80.$   
 $t_{n+1} = 100 - 20(n+1) = 80 - 20n = t_n - 20.$  E

Q7  $u_{n+1} = 4u_n - 2,$   
 $u_2 = 2, u_3 = 4u_2 - 2 = 6, u_4 = 4u_3 - 2 = 22$  C

Q8  $D_1 = 15, D_2 = 0.15D_1 + 15, \dots, D_{n+1} = 0.15D_n + 15$  C

Q9 Let  $x$  metres be the distance between check points 1 and 2.  
 Check points: 1  $\leftrightarrow$  2  $\leftrightarrow$  3  $\leftrightarrow$  4 5 6 7 8 9 10  
 $x \quad x+50 \quad x+100 \quad \dots$

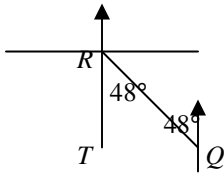
AP:  $a = x, d = 50, S_9 = \frac{9}{2}(2x + (9-1)50) = 4500, \therefore x = 300.$   
 Distance between check points 2 and 3 =  $300 + 50 = 350.$  D

**Module 2: Geometry and trigonometry**

Q1  $\frac{GH}{14} = \frac{24}{12}, GH = 28$  D

Q2  $s = \frac{a+b+c}{2} = \frac{1.92+8.24+9.20}{2} = 9.68$  D

Q3

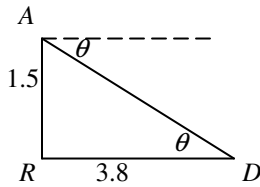


$$360^\circ - 48^\circ = 312^\circ$$

Q4 Read contour map B.

Q5  $V = 160 \times (1 \times 2 \times 3) = 960 \text{ cm}^3$

Q6



$$\theta = \tan^{-1}\left(\frac{1.5}{3.8}\right) \approx 21.5^\circ$$

Q7  $CR = \sqrt{3.8^2 + 12^2} = 12.59$ ,

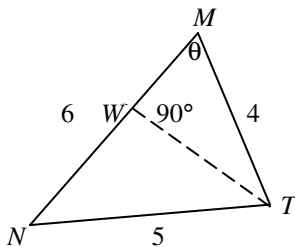
$$\angle ACR = \tan^{-1}\left(\frac{1.5}{12.59}\right) \approx 6.80^\circ$$

Q8 Internal radius =  $\frac{29}{2} - 2 = 12.5 \text{ mm} = 1.25 \text{ cm}$

Cylindrical volume =  $\pi r^2 l = \pi (1.25)^2 \times 8500 = 41724.3 \text{ cm}^3$

Number of litres  $\approx 42$

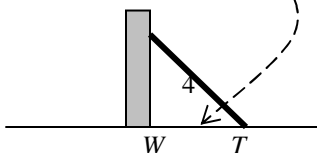
Q9



The cosine rule:  $\cos \theta = \frac{6^2 + 4^2 - 5^2}{2 \times 6 \times 4}$ ,

$$\theta = \cos^{-1}\left(\frac{6^2 + 4^2 - 5^2}{2 \times 6 \times 4}\right) = 55.77^\circ$$

$$TW = 4 \sin \theta = 4 \sin 55.77^\circ = 3.3072$$



Maximum height =  $\sqrt{4^2 - 3.3072^2} \approx 2.3 \text{ m}$

**Module 3: Graphs and relations**

Q1 Steepest slope from 2 to 4 hours. B

Q2  $4.5 + 2.5 = 7.0$  C

Q3 20 cents for 5 hours, 4 cents for one hour. A

E

Q4 B

B

Q5 E

C

Q6  $x \geq 4, y \geq x, x + y \leq 18$  D

Q7  $C = 5x + 4y$ , C is maximum at (19,6) .

$$C_{\max} = 5 \times 19 + 4 \times 6 = \$119$$
 C

Q8 Total cost =  $150 + 3 \times 4 \times 20 = \$390$  .

Hourly charge to break even =  $\frac{390}{4} = \$97.50$  . C

A

Q9 Let  $n$  be the number of cards produced.

The cost  $C(\$)$  in producing  $n$  cards is  $C = 2n + 50$ , the equation of the straight-line graph.

A

To produce 150 cards,  $C = \$350$  .

Let  $\$x$  be the selling price of one card.

Profit =  $150x - 350 = 175$ ,  $x = \$3.50$  .

D

**Module 4: Business-related mathematics**

Q1  $I = \frac{PrT}{100} = \frac{800 \times 4 \times 2}{100} = 64$  B

Q2  $\frac{6500 \times 3.5 \times T}{100} = 910, T = 4$  D

Q3 Total amount of instalments =  $25 \times 24 = \$600$

Borrowed amount =  $500 - 50 = \$450$

Interest paid =  $600 - 450 = \$150$

$$\frac{450 \times r \times 2}{100} = 150, r \approx 16.7$$
 B

Q4 Value =  $65000 - 132600 \times 0.22 = \$35828$  E

Q5 1/1/2009    1 y later    2 y later    .....     $n$  y later  
 $\$5000$      $\$5000(0.80)^1$      $\$5000(0.80)^2$      $\$5000(0.80)^n$

Let  $5000(0.80)^n < 1500, n > 5.4 \therefore$  6 years later from 1/1/2009, i.e. 1/1/2015.

D

C

