

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

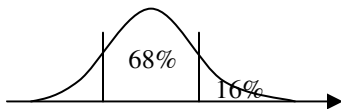
Q3 A

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 \longleftrightarrow 2 \longleftrightarrow 3 \longleftrightarrow 4 5 6 7 8 9 10
 $x \quad x+50 \quad x+100 \quad \dots$

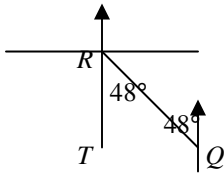
AP: $a = x, d = 50, S_9 = \frac{9}{2}(2x + (9-1)50) = 4500, \therefore x = 300.$
 Distance between check points 2 and 3 = $300 + 50 = 350.$ D

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

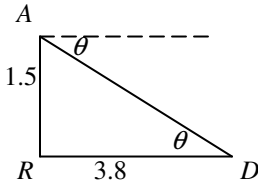


$360^\circ - 48^\circ = 312^\circ$

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

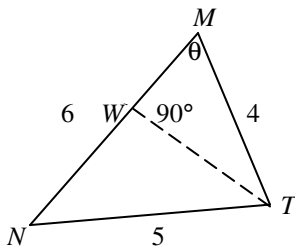
$\angle ACR = \tan^{-1}\left(\frac{1.5}{12.59}\right) \approx 6.80^\circ$

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 ≈ 42

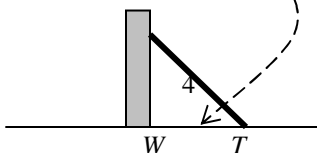
Q9



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.

Q2 $4.5 + 2.5 = 7.0$

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

Q4

Q5

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

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

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

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

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

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.

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

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

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

Module 4: Business-related mathematics

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

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

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

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

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

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

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

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.

