



2019 NSW ESA Mathematics Standard 1 Solutions

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Section I

1	2	3	4	5	6	7	8	9	10
C	B	B	C	A	D	A	B	D	B

Q1 **C**

Q2 **B**

Q3 **B**

Q4 **C**

Q5 **A**

Q6 **D**

Q7 $92\% - 86\% = 6\%$ **A**

Q8 $MHR = 192, 60\% \times 192 \approx 115, 80\% \times 192 \approx 154$ **B**

Q9 **D**

Q10 Base of $\Delta_1 = \sqrt{5^2 - 3^2} = 4$, base of $\Delta_2 = 8$

Area of $\Delta_2 = \frac{1}{2} \times 6 \times 8 = 24$ **B**

Section II

Q11 $28 \times 4 + 8 = 120$ dollars

Q12 $\frac{h}{150} = \tan 12^\circ, h \approx 32$ m

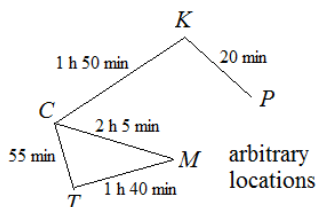
Q13 $200 \times 36 - 6000 = 1200$ dollars

Q14 $A = 7.70, B = 7.70 + 5.00 + 9.00 + 8.50 + 3.20 + 2.85 = 36.25$

Q15 Area $= 8 \times 8 + \frac{1}{2} \pi \times 4^2 \approx 89$ cm²

Q16 $800 \times \frac{3}{100} \times \frac{7}{12} = 14$ dollars

Q17



Q18a $200 + 50 + 150 = 400$ km

Q18b Section B, about 100 km per hour

Q19 $IQR = 194 - 185 = 9, Q_L - 1.5 \times IQR = 185 - 1.5 \times 9 = 171.5$
 $170 < 171.5, \therefore$ the height of the shortest player is an outlier.

Q20a 6

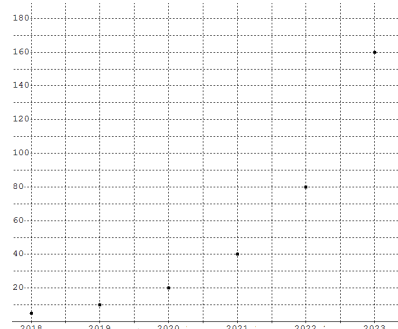
Q20b Use a ruler to measure in cm the length (L) and width (W) of the shaded part. Actual perimeter $= 2(L+W) \times 0.5$ m

Q21 Value (\$) $= 24950 \times (100\% - 14\%)^{10} = 5521.47$

Q22 The favourite colour of a person may not be one of the three listed colours.

Q23a Missing entries in order: 20, 80, 160

Q23b



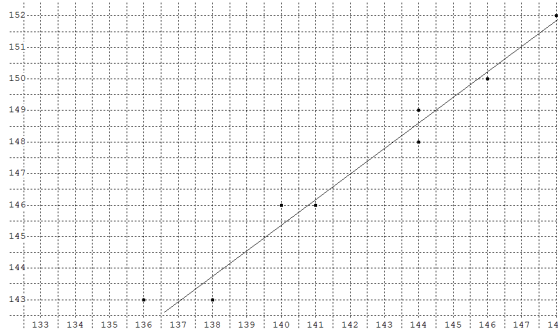
Q23c Exponential model: The trend of the points is curving upwards, rising with increasing rate with time (years).

Q24 $20 \times (100\% - 30\% - 15\%) = 11$

Q25 Perimeter $= \frac{120}{360} \times 2\pi \times 10 + 10 + 10 \approx 40.9$ m

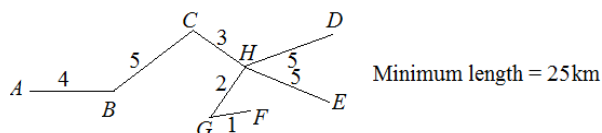
Q26 Total cost $= 5 \times 7 \times (70 + 30) + 4 \times 1.5 \times (70 + 30) + 5400 + 1800 + 160 + 375 = 11835$ dollars

Q27a



Q27b About 151 cm

Q28a



Minimum length = 25km

Q28b CGHE



$$Q29 \quad \frac{3}{1+3+6} \times 3.5 = 1.05 \text{ m}^3$$

Q30a 20 bird houses

$$Q30b \text{ Profit } (\$) = R - C = 1600 - 1100 = 500$$

$$Q31 \quad \cos \theta = \frac{4.9}{\sqrt{2.5^2 + 6^2}}, \quad \theta \approx 41^\circ 5'$$

$$Q32 \text{ Interest} = 3700 \times \left(1 + \frac{18.25}{100 \times 365}\right)^{11} - 3700 \approx 20.40$$

Closing balance ≈ 3720.40

$$\text{Minimum payment} = 2\% \times 3720.40 \approx 74.41$$

$$Q33a \quad p = \frac{4}{7}d$$

$$Q33b \quad d = \frac{y}{76} = \frac{93100}{76} = 1225, \quad p = \frac{4}{7} \times 1225 = 700$$

$$Q34 \quad C = \frac{A(y+1)}{24}, \quad y = \frac{24C}{A} - 1 = \frac{24 \times 120}{500} - 1 = 4.76$$

$$Q35a \quad 22800 - 22472 = 328 \text{ dollars}$$

$$Q35b \text{ Account X: } 20000 + 20000 \times 0.07 \times 8 = 31200 \text{ dollars}$$

$$\text{Account Y: } FV = 20000 \times (1 + 0.06)^8 \approx 31876.96 \text{ dollars}$$

\therefore There would be more money in Y than in X at the end of 8 years.

Q36 The pavers fit neatly to cover the path with no gaps or overlaps.

Number of pavers

$$= \frac{\text{area of the path}}{\text{area of each paver}} = \frac{(840 + 360)(540 + 360) - 840 \times 540}{\frac{1}{2} \times 20 \times 15} = 4176$$

Please inform mathline@itute.com re conceptual and/or mathematical errors.