2024 NSW ESA Mathematics Standard 1 Solutions

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Section I

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

Q1 C

Q2 B

Q3 A

Q4 $\$500 + \$500 \times 0.10 = \$550$ D

Q5 $\$25000 \times 0.25 = \$6250$ C

Q6 B

Q7 $\dfrac{x}{20} = \cos 40°$, $x = 20\cos 40°$ A

Q8 $180 \times 1.025^3 = 193.84$ D

Q9 $2x + 9 = 3 \times 11$, $x = 12$ D

Q10 A

Section II

Q11 $8 \times 50 = 400 \text{ cm} = 4 \text{ m}$

Q12 Strong negative correlation

Q13a $\text{IQR} = 7 - 1 = 6$

Q13b $7 + 1.5 \times 6 = 16$, $15 < 16$.: 15 is not an outlier

Q14a $\text{Distance} = \sqrt{186^2 + 50^2} \approx 193 \text{ m}$

Q14b $\tan^{-1}\left(\dfrac{50}{186}\right) \approx 15°$.: bearing of Hotel from Station $\approx 345°$

Q15a Shortest path *T*-*Y*-*W*-*H*: distance $= 30 + 15 + 20 = 65$ km

Q15b Shortest path *Y*-*W*-*H*-*M*-*G*:
length $= 15 + 20 + 29 + 25 = 89$ km

Q16 $30.13 \times 0.650 \times 6 \approx 117.51 \approx \$1.18$

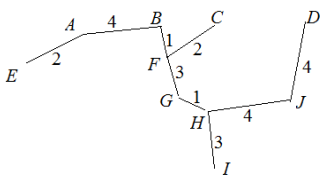
Q17a 8, 10, 12, 14, 16, 18

Q17b There are 14 numbers which are not even and they are greater than 7. Probability $= \dfrac{14}{20} = 0.7$

Q18 $\text{Area} = \dfrac{1}{2} \times 3 \times 2 \times 7 + \dfrac{1}{2}\pi \times 3^2 \approx 35 \text{ m}^2$

Q19 $7.3a + 38 = 156$, $a \approx 16$

Q20a $\text{Weight} = 2 + 4 + 1 + 2 + 3 + 1 + 3 + 4 + 4 = 24$



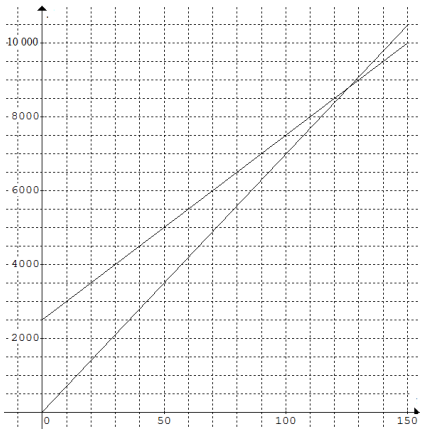
Q20b Yes, because some edges have the same weights.

Q21 $1500 \times 0.06 \times \dfrac{3}{12} = \$22.50$

Q22 9 am *B* is 10 am *A* .: 1336 *B* is 1436 *A*
Flight duration $= 1436 - 1159 = 2$ hours 37 minutes

Q23a $2500

Q23b



Q23c Read from graph. Intersection at $x = 125$, x is the number of tickets (people)

Q23d Revenue: $70x$ Cost: $50x + 2500$
Profit $\$P = 70x - (50x + 2500) = 20x - 2500$
When $x = 300$, $\$P = 20 \times 300 - 2500 = 3500$

Q24 *A* is negatively skewed and *B* is positively skewed.
Medians of *A* and *B* are 4 and 3 respectively.
Both *A* and *B* have the same range of 4 and *IQR* of 2.

Q25 $\dfrac{35}{L} = \sin 4°$, $L = \dfrac{35}{\sin 4°} \approx 502$ m

Q26 $I = 600 \times 1.0007^{30} - 600 \approx \$12.73$

Q27 Let x be the hours of overtime.
$45 \times (38 + x \times 1.5) = 2790$.: $x = 16$

Q28 Alex: Interest $= \$1800 \times 0.075 \times 5 = \$675$
Jun: $\dfrac{6.0\%}{4} = 1.5\% = 0.015$ per quarter
Interest $= \$1800 \times (1.015^{20} - 1) = \$624.34$
.: Alex will have the greater amount.

Q29a Length $= 4000$ mm $= 4$ m; width $= 500$ mm $= 0.5$ m

Q29b Area to be tiled $= 6 \times 3 - 4 \times 0.5 = 16 \text{ m}^2$
Number of tiles $= \dfrac{16}{0.2 \times 0.5} = 160$; number of boxes $= \dfrac{160}{15} = 10\frac{2}{3}$ i.e. 11
Cost $= \$100 \times 11 = \$1100$

Q30 End of first 4 years, value $= 50000 - 1500 \times 4 = \$44000$
End of next 6 years, value $= 44000 \times 0.65^6 \approx \$3318..43$
Total depreciation $= 50000 - 3318.43 = \$46681.57$

Q31 40 km/h $= \dfrac{40000}{60 \times 60} = \dfrac{100}{9}$ m/s; time required $= \dfrac{150}{\frac{100}{9}} = 13.5$ s

Q32a $AB = 3 \text{ km/h} \times \dfrac{24}{60} \text{ h} = 1.2 \text{ km} = 1200 \text{ m}$
.: 6 cm represent 1200 m .: scale is 1 cm : 20000 cm i.e. 1 : 20000

Q32b $BC = 200 \text{ m} \times 7 = 1400 \text{ m} = 1.4 \text{ km}$

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