2022 NSW ESA Mathematics Standard 1 Solutions

Section I

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

Q4 $A=\pi\times3.55^2\approx39.6$ B

Q5 $\frac{x}{12}=\frac{3}{2},\ x=18$ C

Q7 $5\times(9\times\$20.45+\$16.20)=\$1001.25$ C

Q8 $48°+180°=228°$ C

Q9 $FV=PV(1+r)^n,\ n=2\times10=20,\ r=\frac{1}{2}\times4\%=2\%=0.02$

$\therefore\ PV=\frac{FV}{(1+r)^n}=\frac{150000}{(1+0.02)^{20}}$ D

Section II

Q11a 5 doors

Q11b Use a ruler to measure the length (drawing) of the bedroom.
Length (drawing) : actual length = 55 mm : 5500 mm = 1 : 100

Q11c $\text{Area}=5.5\times5.0+4.0\times(4.5+2.5)=55.5$ square metres

Q12 $210\times9+0.35\times2700=2835$ dollars

Q13a Option A: Simple and easy to make an outcome statement in percentage of the investigation.
Option B: It provides a more detailed analysis of students' thoughts of the canteen food.

Q13b Unequal widths of the columns. The vertical axis is not drawn to scale.

Q14a 140 km

Q14b 10 am

Q14c $40+40+140=220$ km

Q14d 11:00 am to 11:30 am, steepest negative gradient

Q15a Maximum heart rate $=220-25=195$ bpm

Q15b $50\%\times195=97.5,\ 85\%\times195=165.75$
Between 97 and 165 bpm (inclusive)

Q16a Non-linear

Q16b 6 m

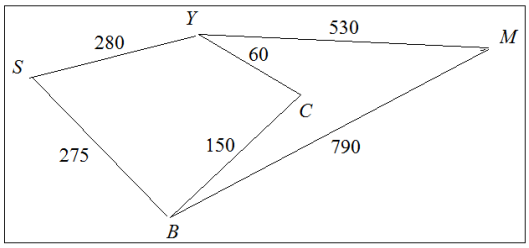
Q17a 21, 23, 25, 27 and 29

Q17b $\Pr(\text{does not win})=1-\frac{5}{30}=\frac{25}{30}=\frac{5}{6}$

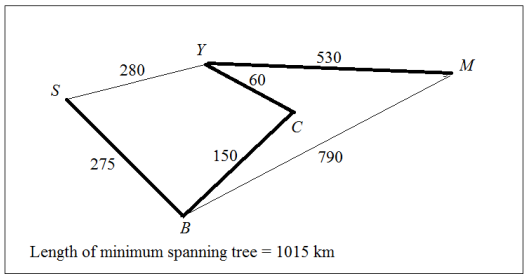
Q18 9 pm Monday + 5 hours + 8 hours = 10 am Tuesday Singapore.

Q19 $24=\frac{\text{age}\times200}{150},\ \text{age}=\frac{24\times150}{200}=18$ months old

Q20a



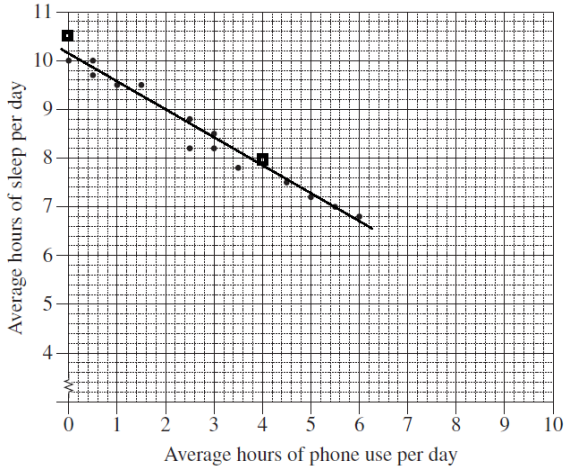
Q20b



Q21 $0.02\times800000+0.015\times(1500000-800000)=26500$ dollars

Q22 Energy $=2500\times3=7500$ Wh $=7.5$ kWh each day at \$0.27 per kWH
For seven days, cost $=7\times7.5\times\$0.27=\$14.175\approx\$14.18$

Q23a, b 9 hours of sleep per day on average



Q24 Fund A: Simple interest $=\$7000\times0.052\times3=\$1092$
Fund B: Interest compounded annually
$=\$7000\times(1+0.05)^3-\$7000=\$1103.375$
Difference $=\$1103.375-\$1092=\$11.375\approx\$11.38$

Q25a 24

Q25b $P=R-C=4\times60-(1.5\times60+60)=90$ dollars

Q26 Balance before payment $=\$7500\times\left(1+\frac{0.21}{365}\right)^{16}=\$7569.34$

Closing balance $\$7569.34-\$2000=\$5569.34$

Q27 Side $AC = \sqrt{7800^2 - 3000^2} = 7200$ m

Area $= \frac{1}{2} \times 3000 \times 7200 = 10800000 \text{ m}^2 = 1080$ hectares

Cost $= \$500 \times 1080 = \$540000$

Q28 Taxable income (\$) $= 67000 + 780 - 1000 = 66780$

Tax on (\$45000 to \$66780) $= (66780 - 45000) \times \$0.325 = \$7078.50$

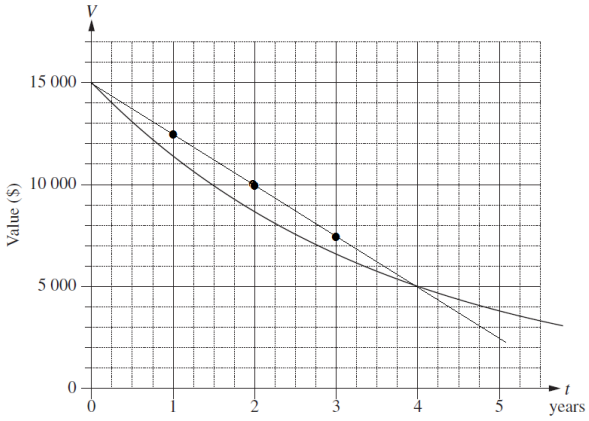
Tax payable $= \$5092.00 + \$7078.50 = \$12170.50$

Q29 $Q_3 + 1.5 \times IQR = 39 + 1.5 \times (39 - 27) = 57$, $59 > 57$

.: 59 could be considered as an outlier.

Q30a

End of year	*Straight-line depreciated value (\$)*
0	15000
1	12500
2	10000
3	7500



Q30b Draw a straight line through the three points. The line intersects the curve (declining-balance method) at $(4, 5000)$

.: after 4 years

Q31 $\$6100 = P \times (1 + 0.058)^{10}$, $P \approx \$3471.15$

Q32 $BA = 35 \tan 41°$, $\sin\theta = \frac{BA}{93} = \frac{35 \tan 41°}{93} \approx 0.32715$

$\theta = \sin^{-1} 0.32715 \approx 19.096° \approx 19° 6'$

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