

Section A

①

Q1)

a)

i) 12

ii) 16-8

$$\text{IQR} = 8$$

b) This data is positively skewed.

Q2)

a) 12

b)

Before

10, 21, 22, 24, 24, 30, 32, 34, 36, 42, 46, 48

After

3, 7, 22, 22, 23, 29, 35, 36, 37, 37, 40, 42

$$\text{Before} = \frac{30 + 32}{2}$$

$$= \frac{62}{2}$$

$$= 31$$

$$\text{After} = \frac{29 + 35}{2}$$

$$= \frac{64}{2}$$

Q2)

b) (Continued)
 $= 32$

∴ The median number of cigarettes smoked before the program was 31 and the median number of cigarettes smoked after program was 32.

c) Before

$$Q1 = \frac{22 + 24}{2}$$

$$Q1 = \frac{46}{2}$$

$$Q1 = 23$$

$$Q3 = \frac{36 + 42}{2}$$

$$= \frac{78}{2}$$

$$= 39$$

$$\begin{aligned} \text{IQR} &= Q3 - Q1 \\ &= 39 - 23 \\ &= 16 \end{aligned}$$

Q2)

c) (continued)

After

$$Q1 = \frac{22+22}{2}$$

$$= \frac{44}{2}$$

$$= 22$$

$$Q3 = \frac{37+37}{2}$$

$$= \frac{74}{2}$$

$$= 37$$

$$\begin{aligned} IQR &= Q3 - Q1 \\ &= 37 - 22 \\ &= 15 \end{aligned}$$

d) Before

$$\text{Median} = 31$$

$$IQR = 16$$

After

$$\text{Median} = 32$$

$$IQR = 15$$

Q2)

d) (continued)



No, while there is evidence that some people reduced the number of cigarettes they smoked, the median number of cigarettes smoked after the program increased, and the spread of data is similar to before the program started.

Q3) B

Q4)

$$\begin{aligned}
 a) \quad z\text{-score} &= \frac{\text{score} - \text{mean}}{\text{standard deviation}} \\
 &= \frac{78 - 84}{12} \\
 &= \frac{-6}{12} \\
 &= -0.5
 \end{aligned}$$

$$b) \quad z\text{-score} = \frac{\text{score} - \text{mean}}{\text{standard deviation}}$$

$$\begin{aligned}
 &\times 10 \\
 0.1 &= \frac{8 - 74}{10} \times 10
 \end{aligned}$$

$$\begin{aligned}
 8 - 74 &= -66 \\
 +74 &+74
 \end{aligned}$$

Q4)

b) (continued)



Veronica's raw score in Italian was 75

c) Veronica's best subject was Italian as her z-score was higher than her z-score for Spanish, and her score was higher than the mean.

Q5)

a)

Mass (kg)	1.00	1.01	1.02	1.03	1.04
z-score	-2	-1	0	1	2

b)

$$i) 34 + 13.5 + 2.35 + 0.15 \\ = 50\%$$

$$ii) 13.5 + 34 + 34 + 13.5 \\ = 95\%$$

$$iii) 13.5 + 34 \\ = 47.5\%$$

$$iv) 0.15\%$$

(6)

Section B

Q1) $x + y = 5$

$x - y = 5$

Line 1

$x = 0$

$y = 5$

$x + y = 5$

$0 + 5 = 5$

Line 2

$x = 5$

$y = 0$

$x - y = 5$

$5 - 0 = 5$

Q2) $FV = PV(1 + r)^n$

$FV = \$60,000$

$r = 4\% \text{ per annum, compounded quarterly}$

$\frac{0.04}{4}$

$= 0.01$

$n = 5 \text{ years } (5 \times 4 \text{ quarters})$

$= 20 \text{ quarters}$

$60,000 = PV(1 + 0.01)^{20}$

$60,000 = PV(1.22019004)$

(7)

Q2) (continued)

$$\frac{60,000}{1.22019004} = \frac{PV(1.22019004)}{1.22019004}$$

$$PV = \frac{60,000}{1.22019004}$$

$$PV = 49,172.66822$$

$$\therefore PV = \$49,173$$

$$Q3) c^2 = a^2 + b^2 - 2ab \cos C$$

$$h^2 = 88^2 + 146^2 - 2 \times 88 \times 146 \times \cos 53^\circ$$

$$h^2 = 29060 - 15464.23883$$

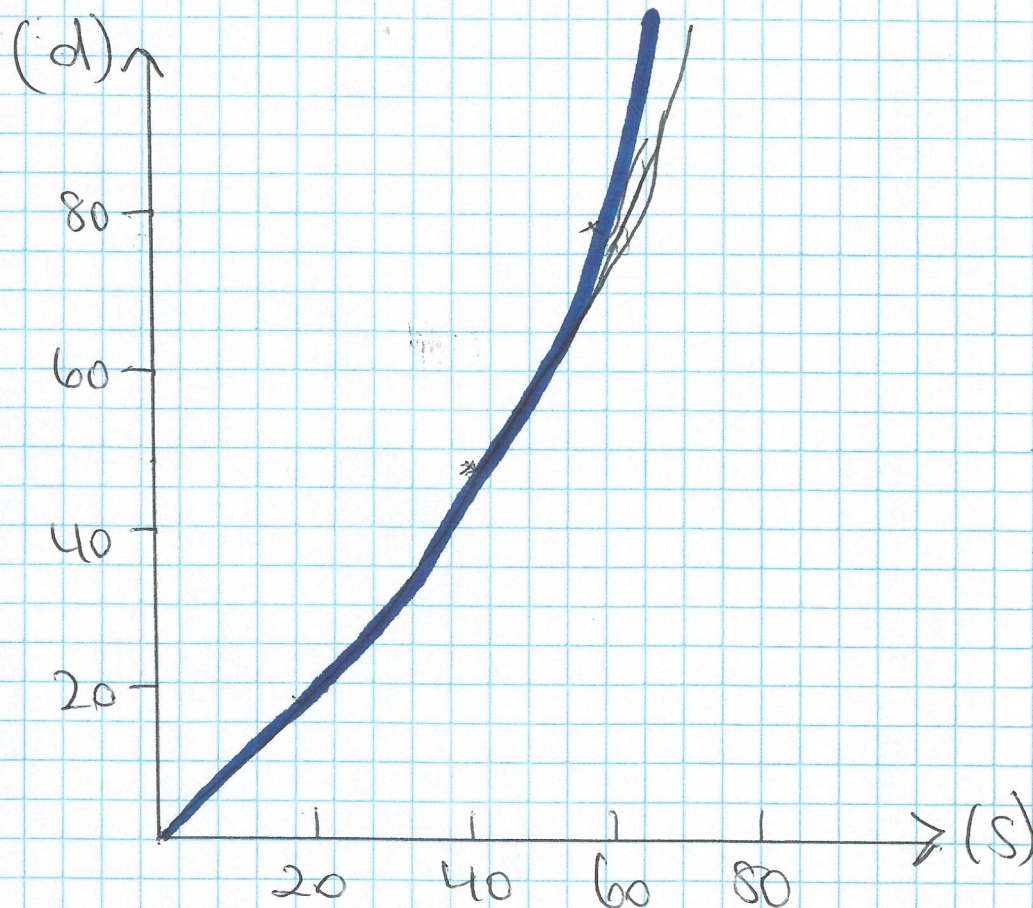
$$h^2 = 13595.76117$$

$$h = 116.6008626$$

$$\therefore h = 116.6$$

24)

a)



b) $d = 0.01s^2 + 0.7s$

$$d = 0.01 \times 40^2 + 0.7 \times 40$$

$$d = 44 \text{ m}$$

$$d = 0.01s^2 + 0.7s$$

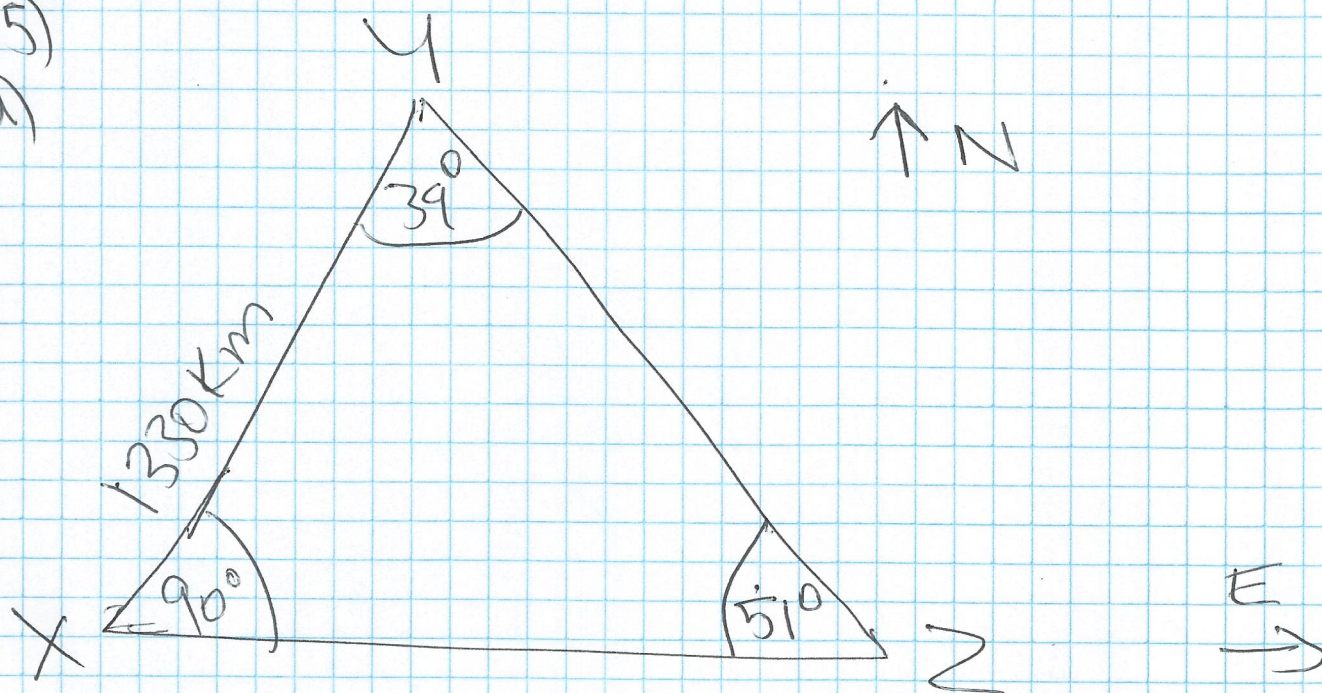
$$d = 0.01 \times 60^2 + 0.7 \times 60$$

$$d = 78 \text{ m}$$

$$\text{Difference} = 78 - 44$$

$$\therefore = 34 \text{ m}$$

(9)

Q5)
a)

$\angle XYZ$ is 90° because the angle sum of a triangle is 180° . Therefore $180 - 39 - 51 = 90^\circ$

b) ~~distance = speed~~
~~distance~~

distance = $\frac{\text{speed}}{\text{time}}$

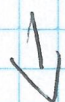
Change the subject of the formula to calculate the flight time.

$\therefore \text{Time} = \frac{\text{distance}}{\text{speed}}$

$$T = \frac{1330 \text{ km}}{570 \text{ km/h}}$$

Q5)

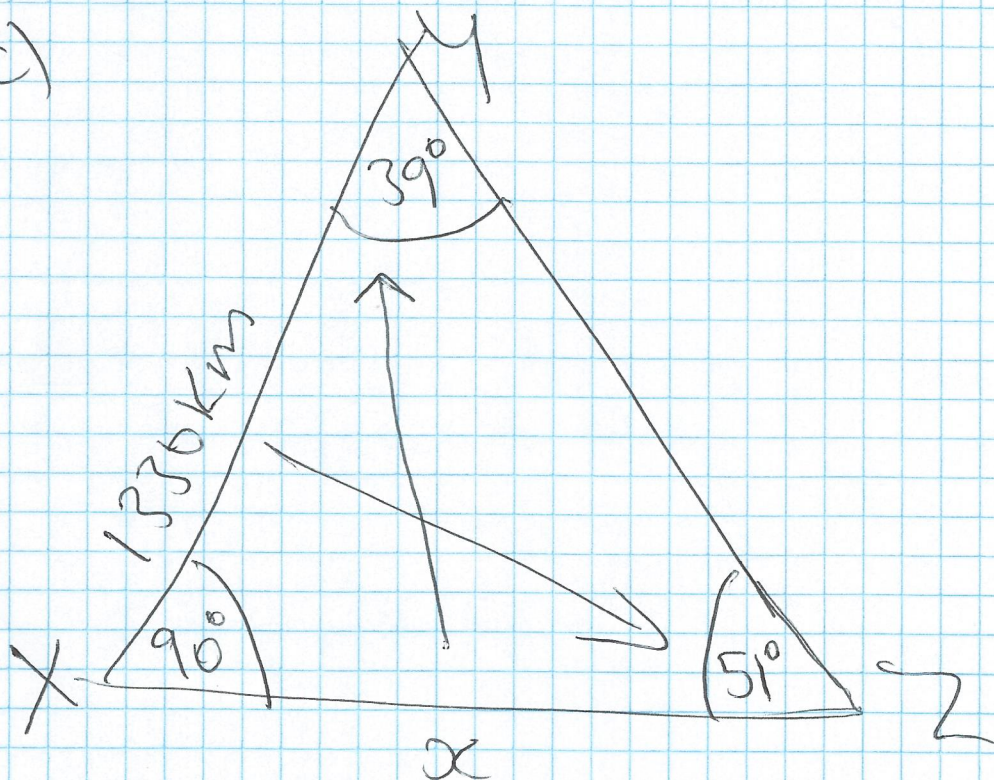
b) (continued)



$$T = 2.33$$

Flight time = 2 hours and 20 minutes

c)



$$\frac{x}{\sin 39^\circ} = \frac{1330}{\sin 51^\circ}$$

$$x = \frac{1330 \sin 39^\circ}{\sin 51^\circ}$$

$$x = 1077.012764$$

$$\therefore x = 1077 \text{ km}$$

Qb)

a)

i) The critical path BDEF is the longest time path between the start and finish vertices of this network.

ii) $50 - 43 = 7$ days

b) ~~Float time = LST next activity - EST of this~~

↓
Float time = LST - EST - duration of this activity
 $= 50 - 20 - 15$
 $= 15$ days

c) $A = 15$ days

$$C = 43 - 15$$

$$= 28 \text{ days}$$