Section A

①

Q1)

a)

i) 12 ✓

ii) 16-8 ✓

$\frac{2}{3}$ IQR = 8 ✓

b) This data is positively skewed. ✗

The skew is negative as the "tail" is to the left

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

Before $= \dfrac{30+32}{2}$ ✓

$= \dfrac{62}{2}$

$= 31$ ✓

After $= \dfrac{29+35}{2}$ ✓

$= \dfrac{64}{2}$

Q2)

b) (Continued)

$$= 32 \checkmark$$

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

c) Before

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

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

$$Q1 = 23 \checkmark$$

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

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

$$= 39 \checkmark$$

$$IQR = Q3 - Q1$$

$$= 39 - 23 \checkmark$$

$$= 16 \checkmark$$

Q2)

c) (Continued)

After

$$Q1 = \frac{22+22}{2}$$
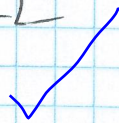
$$= \frac{44}{2}$$ ✓

$$= 22$$

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

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

$$= 37$$

$$IQR = Q3 - Q1$$

$$= 37 - 22$$

$$= 15$$ ✓

d) Before

Median = 31

IQR = 16

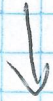After

Median = 32

IQR = 15

22)

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. ✓ In fact no one actually quit!

7

23) B ✓

24)

a) $\text{z-score} = \dfrac{\text{score} - \text{mean}}{\text{standard deviation}}$

$= \dfrac{78 - 84}{12}$ ✓

$= \dfrac{-6}{12}$

$= -0.5$ ✓

Great work, Rachel!

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

$\overset{\times 10}{0.1} = \dfrac{S - 74}{10} \times 10$ ✓

$S - 74 = 1$

$+74 \quad +74$

24)

b) (Continued)
↓

Veronica's raw score in Italian was 75 ✓

4

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.

25)

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) $13.5 + 34 + 34 + 13.5$
$= 95\%$ ✓

$\frac{5}{6}$

iii) $13.5 + 34$
$= 47.5\%$ ✓

iv) 0.15% ✗ $(100 - 95) \div 2 = 95\%$

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

$FV = \$60,000$

$r = 4\%$ per annum, compounded quarterly

$\dfrac{0.04}{4}$ ✓

$= 0.01$

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

$= 20$ quarters

$60,000 = PV(1 + 0.01)^{20}$ ✓

$60,000 = PV(1.2201900 4)$

Q2) (Continued)

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

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

Excellent working!

$$PV = 49,172.66822$$ ✓

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

3

Q3)

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

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

$$h^2 = 29060 - 15464.23883$$

$$h^2 = 13595.76117 \checkmark$$

$$h = 116.6008626$$

$$\therefore h = 116.6 \checkmark$$

2

(24)

a)

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

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

$d = 44m$ ✓

$d = 0.01s^2 + 0.7s$

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

$d = 78m$

Difference $= 78 - 44$

$\therefore = 34m$ ✓

2

Q5)

a)

N39° E   39°

S51° E

alternate angles
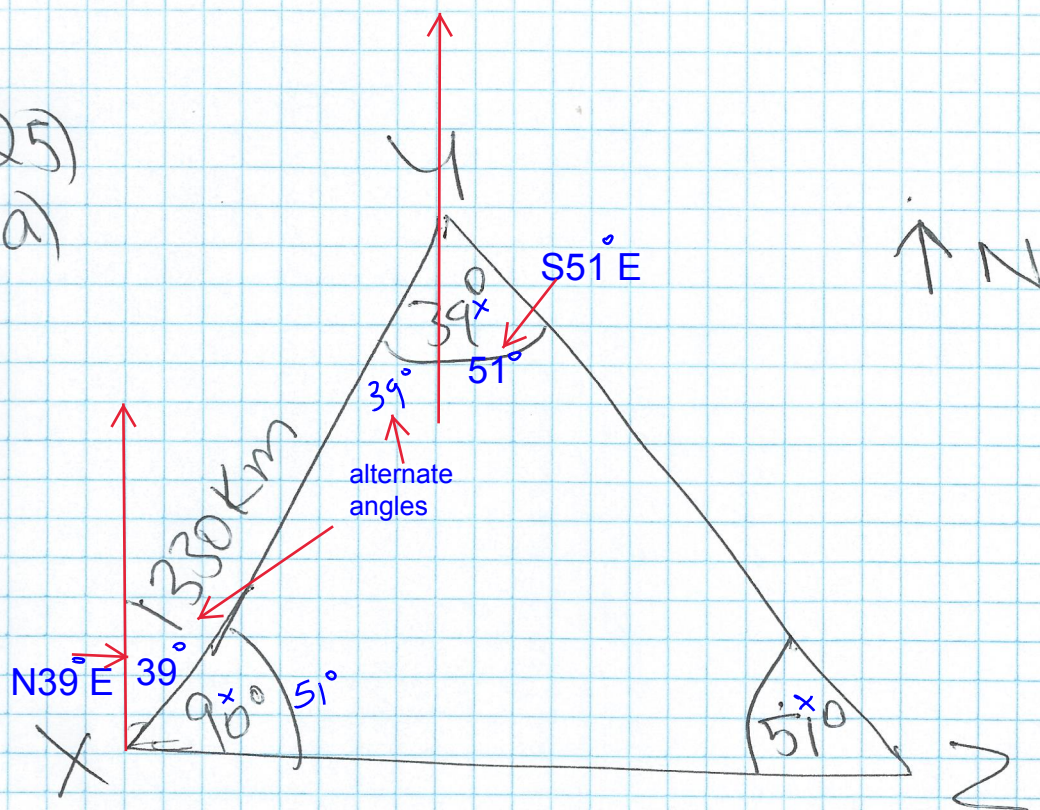
∠X Y Z is 90° because the angle sum of a triangle is 180°. Therefore 180 − 39 − 51 = 90°   ✗   51 + 39 = 90 (see labeling above)

b) ~~distance = speed / distance~~

distance = $\dfrac{speed}{time}$

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

∴ Time = $\dfrac{distance}{speed}$
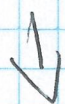
T = $\dfrac{1330 \, km}{570 \, km/h}$ ✓

25)
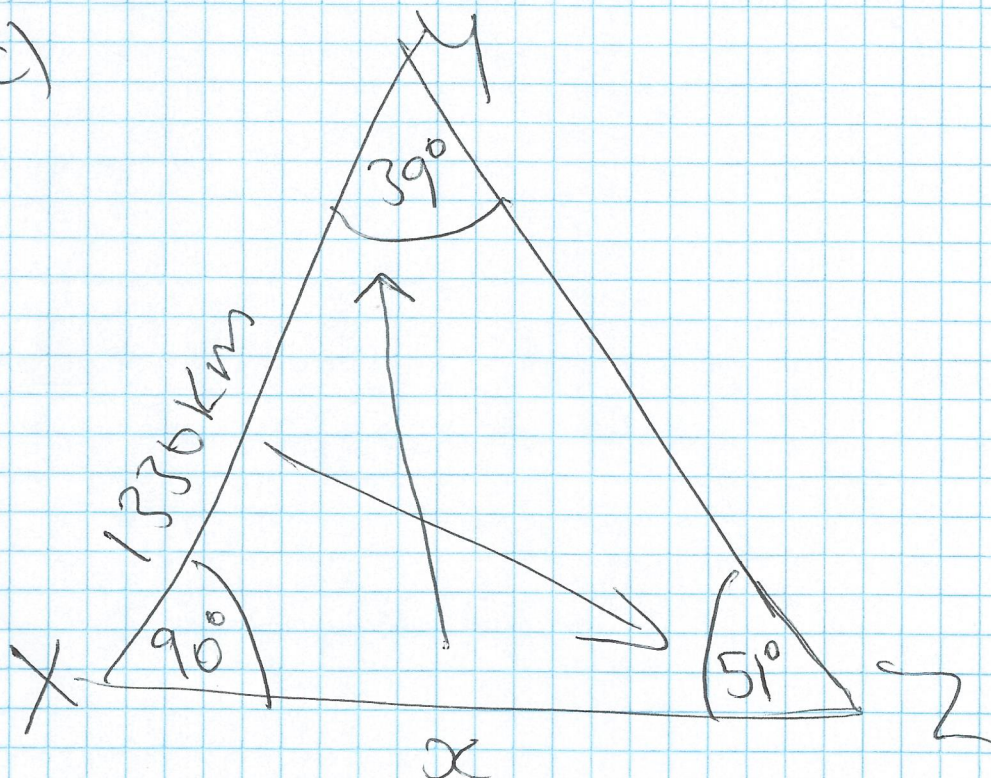
b) (Continued)

$$T = 2.3\dot{3}$$ ✓

flight time = 2 hours and 20 minutes

c)

$2\frac{1}{2}$
$\frac{}{4}$

$$\frac{x}{\sin 39°} = \frac{1330}{\sin 51°}$$

cos 51 = $\frac{1330}{y}$

y = 1330 ÷ cos 51 = 2113km

$$x = \frac{1330 \sin 39°}{\sin 51°}$$

$$x = 1077.012764$$

$$\therefore x = 1077 km$$

This is correct for your diagram, Rachel

Q6)

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

$\dfrac{2}{5}$

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

Float time = LST - EST - duration of this activity

$= 50 - 20 - 15$

$= 15$ days ✗

float time = LST of next activity - EST of this activity - duration of this activity
Given float of G = 3:
3 = 50 - 35 - duration of G
3 = 15 - duration of G
duration of G = 12 days

c) A = 15 days

C = 43 - 15

$= 28$ days ✗

Duration of A must be less than 15 days.
Float of C = 8 days (given)
Let duration of A = 14 days:
8 = 43 - 14 - duration of C
8 = 29 - duration of C
duration of C = 21 days
Thus possible durations are A = 14, C = 21 days