Section A: Driving Safely

Q1)

a) $BAC\ (male) = \frac{10N - 7.5H}{6.8M}$

$= \frac{(10 \times 6) - (7.5 \times 3)}{(6.8 \times 60)}$

$= \frac{60 - 22.5}{408}$

$= \frac{37.5}{408}$

$= 0.091911764\,71$

≈ 0.092

b) $BAC\ (female) = \frac{10N - 7.5H}{5.5M}$

$= \frac{(10 \times 6) - (7.5 \times 3)}{(5.5 \times 60)}$

$= \frac{60 - 22.5}{330}$

$= \frac{37.5}{330}$

$= 0.113636363\,6$

≈ 0.114

Q11) (Continued)

c) $\frac{0.114}{0.015}$

$= 7.6$

$= 7$ hours and 36 minutes

Q22)

a)

Time after drinking (H)	0	1	2	3	4
Blood alcohol content (B)	0.085	0.068	0.051	0.034	0.017

1 hour: $B = 0.085 - 0.017H$

$= 0.085 - (0.017 \times 1)$

$= 0.085 - 0.017$

$= 0.068$

3 hours: $B = 0.085 - 0.017H$

$= 0.085 - (0.017 \times 3)$

$= 0.085 - 0.051$

$= 0.034$

4 hours: $B = 0.085 - 0.017H$

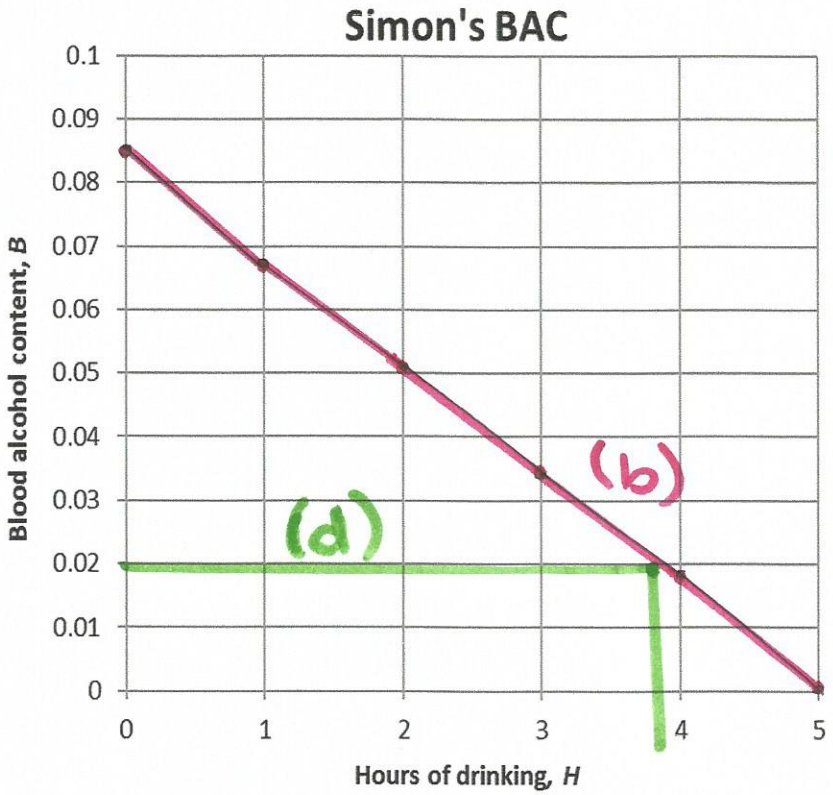
$= 0.085 - (0.017 \times 4)$

$= 0.085 - 0.068$

$= 0.017$

Grid for question 2b) / Section A (ATTACH TO YOUR ANSWER SHEET) **Name:** RACHEL LOVEDAY

Q2) b)



Q2) (Continued)

c) (0, 0.085) (4, 0.017)

$$\frac{0.085 - 0.017}{4 - 0}$$

$$= \frac{0.068}{4}$$

$$= 0.017$$

The gradient is the rate at which Simon's BAC is decreasing per hour.

d) 3.8

$\approx$ 3 hours and 48 minutes

(Also see graph)

e) When $B = 0$

$$0 = 0.085 - 0.017H$$

$+0.017H$ $+0.017H$

~~$0.017H = 0.085$~~

$$\frac{0.017H}{0.017} = \frac{0.085}{0.017}$$

$$H = \frac{0.085}{0.017}$$

$$H = 5$$

Q2) (Continued)

e) Simon's BAC will reach zero after 5 hours.

Q3)

a) 2010

b)

i) $97/364 \times 100 = 26.64835165$

$= 26.6\%$

ii) $253/380 \times 100 = 74.47368421$

$= 74.5\%$

c)

i) $\frac{296 + 267 + 267 + 243 + 211 + 242 + 283}{7}$

$= \frac{1809}{7}$

$= 258.4285714$

$= 258.43$

ii) $\frac{109 + 97 + 102 + 90 + 96 + 108 + 97}{7}$

$= \frac{699}{7}$

Q3) (Continued)

c)

ii) $= 99.85714286$

$= 99.86$

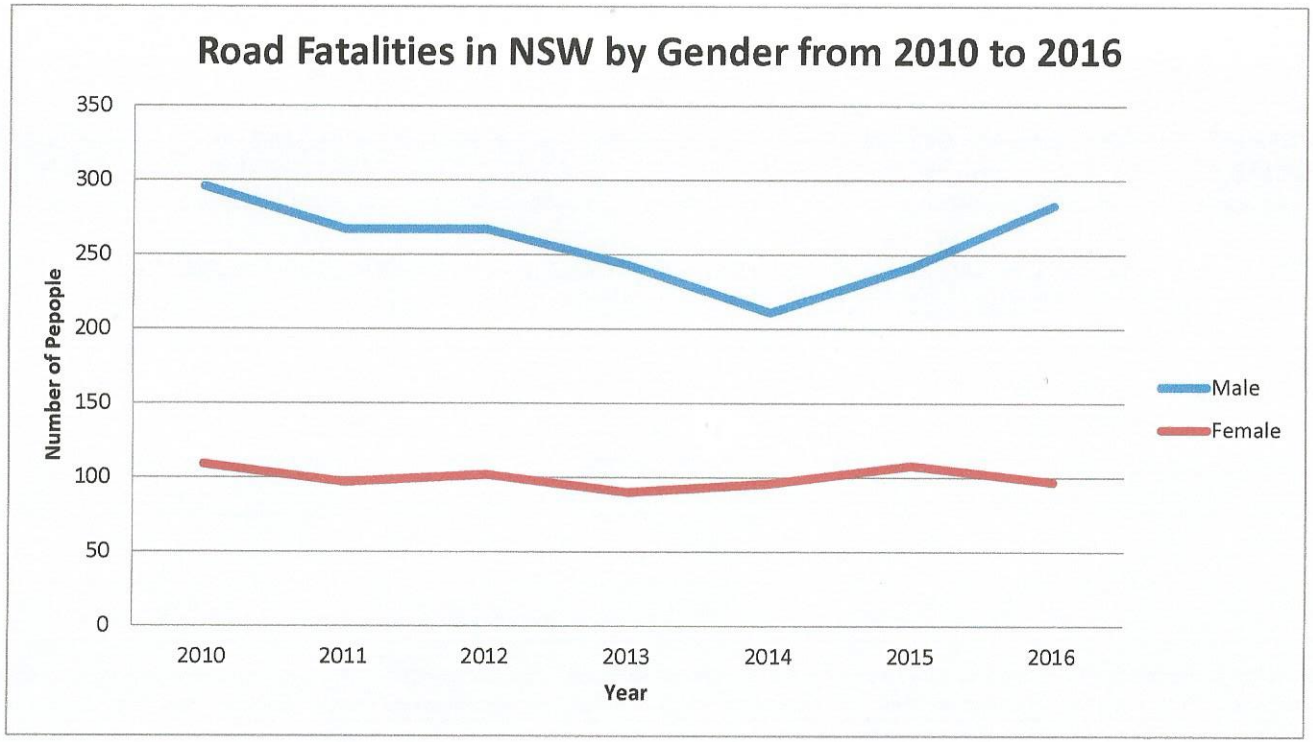
d) Males generally drive more than females and are also known to be more aggressive and risk taking than female drives.

e) $405 - 307$

$= 98$

Q3F

Year	Male	Female
2010	296	109
2011	267	97
2012	267	102
2013	243	90
2014	211	96
2015	242	108
2016	283	97



I completed this graph / Question (3F) in Excel as the question stated I could use a spreadsheet ~~to~~ draw the graph

Q4) $D = ST$

$S = 72$ km/h, $T = 40$ mins

$T = 40$ mins $= \frac{40}{60}$ h $= \frac{4}{6} = \frac{2}{3}$ h

$D = S \times T$

$D = 72 \times \frac{2}{3}$

$D = 48$ km

Q5)

a) 81.4 m

b) 52.7 m

c) $81.4 - 52.7$

$= 28.7$ m

Q6)

a)

i) Reaction distance is the distance the car travels in 1.6 seconds at 75 km/h.

Convert 75 km/h to m/s.

75 km/h = 75,000 m/h

Seconds in one hour = 60 secs x 60 mins

$= 60 \times 60$

$= 3600$

(See next page for my answer to Q6ai). →

Q6) (Continued)

a)

i) $\frac{75,000}{3,600}$

$= 20.83333333$

$= 20.833 \text{ m/s}$

$d = s \times t$

$d = 1.6 \times 20.833$

$d = 33.33$

≈ 33.3

Troy's reaction distance is 33.3m.

ii) Stopping distance = reaction distance + braking distance

$= 33.3 + 23$

$= 56.3\text{m}$

Q6)

b)

i) $d = kv^2$

$d = 23$, $v = 75$ km/h

$23 = k \times 75^2$

$\frac{23}{5625} = \frac{5625k}{5625}$

$k = \frac{23}{5625}$

$k = 0.004088888888$

$k = 0.004$

ii) $d = kv^2$

$d = 0.004 \times 89^2$

$d = 0.004 \times 7921$

$d = 31.684$

$d = 31.7$ m

Section B: Revision

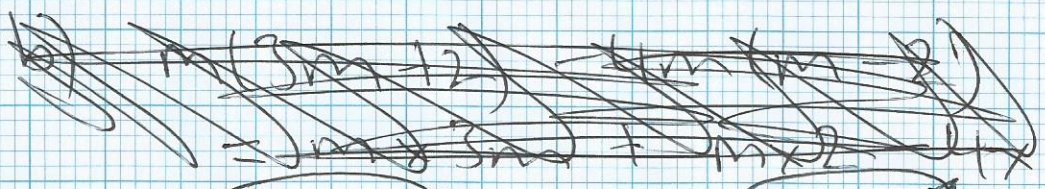
Q1) Data collected on income level (low, medium or high) is classified as ordinal.

Q2)

a) $7(m+2)$

$= 7 \times m + 7 \times 2$

$= 7m + 14$



b) $m(3m+2) - 4m(m-2)$

$m \times 3m + m \times 2 - 4m \times m - 4m \times 2$

$= 3m^2 + 2m - 4m^2 - 8m$

$= 3m^2 + 4m^2 = 7m^2$

$= 2m - 8m = -6m$

$= 7m^2 - 6m$

Q3)

a) 12

b) $9/12 \times 100$

$= 75\%$

Q3) (Continued)

c)

i) 3, 7, 15, 22, 22, 23, 29, 35, 36, 37, 40, 42

$$\text{Median} = \frac{23+29}{2}$$

$$= \frac{52}{2}$$

$$= 26$$

ii) 3, 7, 15, 22, 22, 23, 26 (Q2), 29, 35, 36, 37, 40, 42

$Q2 = 26$

$$Q1 = \frac{15+22}{2}$$

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

$$= 18.5$$

$$Q3 = \frac{36+37}{2}$$

$$= \frac{73}{2}$$

$$= 36.5$$

$$IQR = Q3 - Q1$$

$$= 36.5 - 18.5$$

$$= 18$$

Q4) Percentage error = $\frac{\text{absolute error}}{\text{measurement}} \times 100\%$

$= \frac{\pm 0.5}{15.3} \times 100$

$= 3.267973856$

$= 3.27$

$\approx 3.3\%$

Q5) Area of roof = $49\ m^2$

Volume of rainfall = $49m^2 \times 12mm$

↓

change 12mm to m

↓

$= 49m^2 \times 0.12m$

$= 5.88m^3$

$= 5.88 \times 1000\ L$ ($1m^3 = 1000L$)

$= 5880\ L$

2mm Squares

Q6) Surface area of a sphere: $A = 4\pi r^2$

Diameter = 30.4 cm

Radius = $\frac{30.4}{2}$

= 15.2 cm

$A = 4\pi r^2$

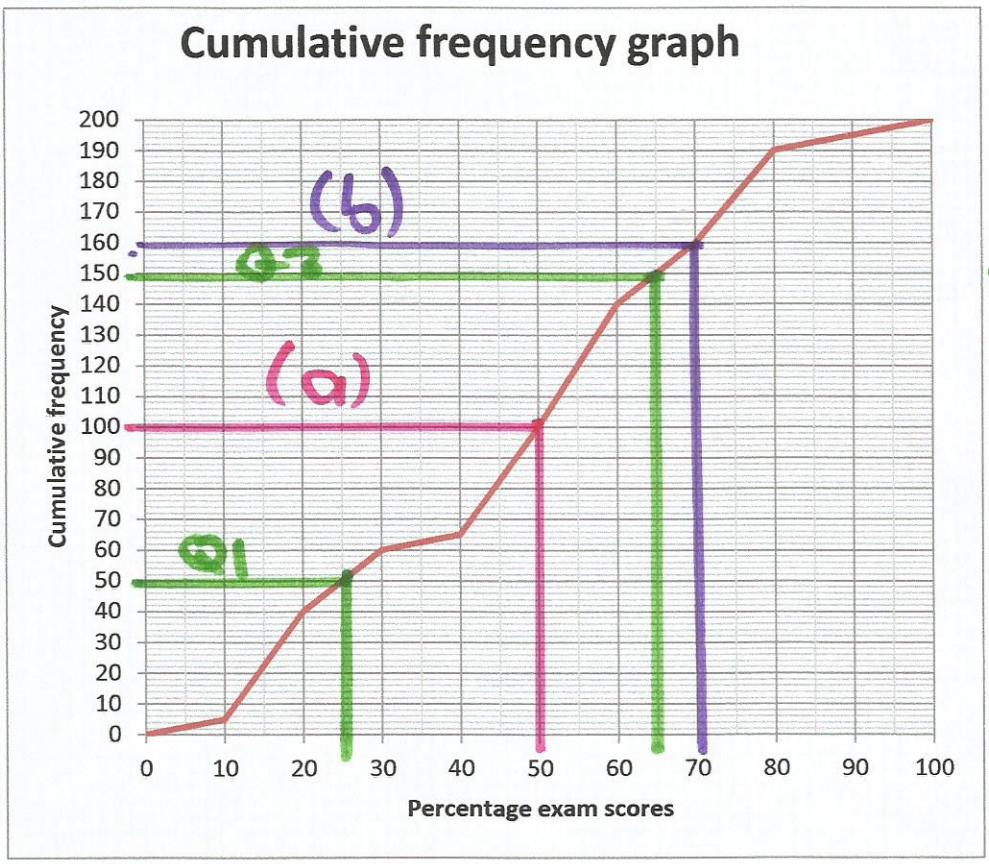
$= 4 \times \pi \times 15.2^2$

$= 4 \times \pi \times 231.04$

$= 2903.334267$

$= 2903 \text{ cm}^2$

7 The cumulative frequency graph shown below is for the percentage scores obtained by 200 students in a particular exam.



Q1 & Q3

8th decile

Median

Q7) (Continued)

a) Median is the halfway point on the cumulative frequency axis = 100

Median = 50

b) The 8th decile is the 80% point on the cumulative frequency axis.

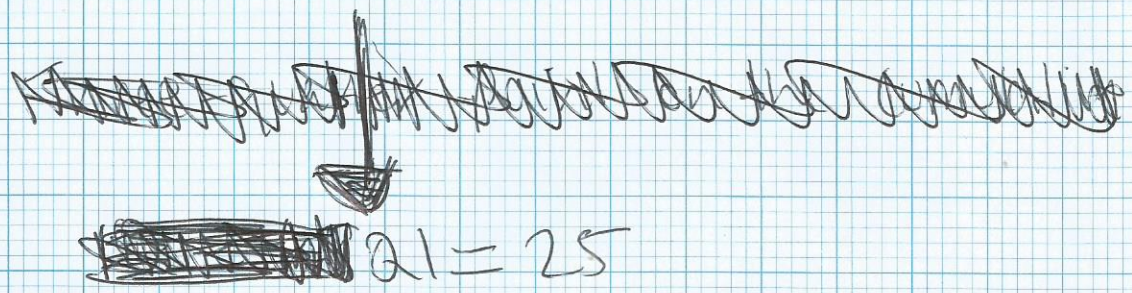
$= 0.8 \times 200$

$= 160$

The 8th decile = 70

c) Quarter point on the cumulative frequency axis $= 1/4 \times 200$

$= 50$



Q1 = 25

Three-quarter point on the cumulative frequency axis $= 3/4 \times 200$

$= 150$

Q3 = 65

IQR = Q3 − Q1

$= 65 - 25$

$= 40$

Q8)

a) 1 calorie (Cal) = 4.184 kJ

= 74 × 4.184

= 309.616

= 309.62 kJ

b) 30 minutes = 530 kJ

1 minute = $\frac{530}{30}$

= 17.66666667 kJ

309.62 ÷ 17.66666667

= 17.52566037

= 17 mins, 32.38 secs

= 18 minutes

Q9)

a) -2020 Abarth 595 ($30,787)
-2020 Abarth 695 (70 Anniversario) ($49,327)

b) I've chosen the 2020 Abarth 595
Total Cost = $30,787
Deposit = $5,000
30,787 - 5,000
= ~~$~~ 25,787
= $26,000

c)
i) $22.24
ii) 22.24 x 60 x 26

60 months in 5 years

26 $1000s in $26,000

= $34,694.40

iii) $34,694.40 - $26,000
= $8,694.40