

6492MR: Assignment 5

Before doing this assignment you need to work through Chapter 12 and review all other chapters of your textbook:

New Century Maths 11 Mathematics Standard (Pathway 2)

By Klaas Bootsma, Sarah Hamper, Margaret Willard, Robert Yen

(see your OLS for more details)

What you need to do

- **Handwrite the answers to the following questions on your own paper**, showing all necessary working.
- There are 2 sections in this assignment:
 - 1. Driving Safely (SECTION A)**
 - 2. Some revision questions (SECTION B)**
- Attempt all questions in each section.
- Leave plenty of space around your answers for your teacher's comments and ways to improve your work.
- If you have studied the work in your textbook, and you are stuck on an assignment question, you can contact us for help.
- It is important to present your work clearly and well to avoid having it returned to you unmarked as a non-serious attempt.

Section A: Driving Safely

- 1 Harry and Emma are both provisional (P plate) drivers and both weigh 60kg.
They both drink 6 standard drinks at the same rate over 3 hours.

The formulas for calculating blood alcohol content are:

$$BAC_{male} = \frac{10N - 7.5H}{6.8M}$$

$$BAC_{female} = \frac{10N - 7.5H}{5.5M}$$

where N = number of standard drinks consumed
 H = number of hours drinking
 M = mass in kg

Find:

- Harry's BAC (correct to 3 decimal places)
- Emma's BAC (correct to 3 decimal places)
- How long Emma should wait before her BAC is zero so that she can legally drive herself home? Assume Emma's BAC is reduced by 0.015 per hour.

- 2 Simon has a blood alcohol content (BAC) of 0.085
His BAC decreases over time according to the linear function $B = 0.085 - 0.017H$

- a) Copy and complete this table of values correct to three decimal places using the given formula.

| Time after drinking, H hours | 0 | 1 | 2 | 3 | 4 |
|-----------------------------------|-------|---|-------|---|---|
| Blood alcohol content, B | 0.085 | | 0.051 | | |

- Graph the linear function on the graph paper provided at the end of this assignment.
- What is the gradient of the line and what does it represent?
- Use your graph to estimate when Simon's BAC reaches 0.02.
- Use the formula to find when Simon's BAC reaches zero.

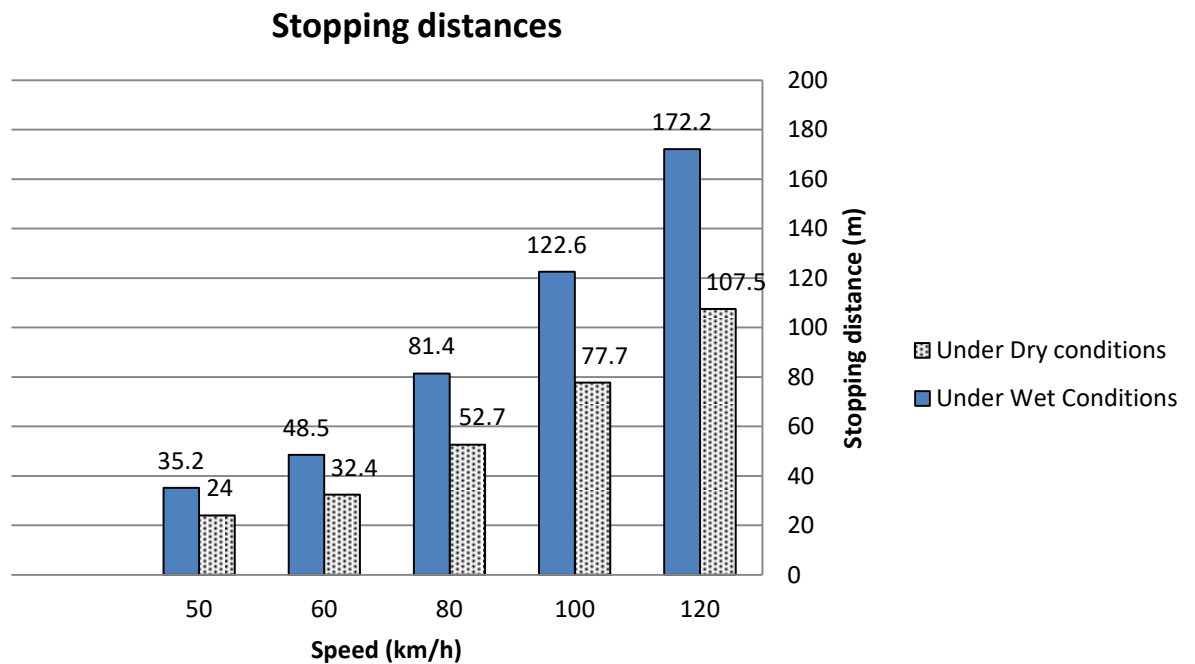
- 3 The table below shows road fatalities in NSW by gender from 2010 to 2016.

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------|------|------|------|------|------|------|------|
| Male | 296 | 267 | 267 | 243 | 211 | 242 | 283 |
| Female | 109 | 97 | 102 | 90 | 96 | 108 | 97 |
| Total | 405 | 364 | 369 | 333 | 307 | 350 | 380 |

Source: Centre for Road Safety, Transport for NSW, State of NSW

- a) Which year shown had the highest number of road fatalities?
- b) Answer each of the following correct to one decimal place:
- i) Of the total fatalities in 2011, what percentage were female?
 - ii) Of the total fatalities in 2016, what percentage were male?
- c) Find the mean number of fatalities in NSW over this 7-year period for:
- i) males
 - ii) females
- d) The table shows that male deaths each year are more than double female deaths.
Why do you think this is so? Give one reason.
- e) What is the range of the total number of fatalities over this 7-year period?
- f) Represent this data as two line graphs drawn on the same grid (provided at the end of this assignment). Use different colours and label each graph.
(Note: you may use a spreadsheet to draw the graph)
- 4 Mark drove at a speed of 72 km/h for 40 minutes. How far did he travel in this time?

- 5 The clustered bar chart below compares the stopping distance for vehicles in dry and wet conditions.



Refer to the graph above. Prudence is travelling at 80 km/h.:

- What is her stopping distance in wet conditions?
- What is her stopping distance in dry conditions?
- How many more metres does it take her to stop in wet conditions rather than in dry conditions?

-
- 6 These definitions will help with the following question:

Reaction time is the time you take from sensing a situation until you apply the brakes
Reaction distance is the distance travelled during your reaction time
Braking distance is the distance travelled from when you apply the brakes until you stop
Stopping distance = Reaction distance + Braking distance

Troy was travelling at 75 km/h when he saw an obstacle over the road.

His reaction time was 1.6 seconds.

- a) (i) What was his reaction distance in metres (correct to one decimal place)?
- (ii) Troy put on his brakes and stopped 23 m later.
What was his stopping distance in metres (correct to one decimal place)?
- b) (i) Use the braking distance formula $d = kv^2$, where $d = 23$ and v km/h is the initial speed of Troy's car to find the value of k , correct to 3 three decimal places.
- (ii) What would be Troy's braking distance (d), when travelling in the same car at 89 km/h (v), correct to one decimal place.

Section B: Revision

- 1 Is data collected on income level (low, medium or high) classified as nominal or ordinal?

- 2 a) Expand:

$$7(m + 2)$$

- b) Expand and simplify:

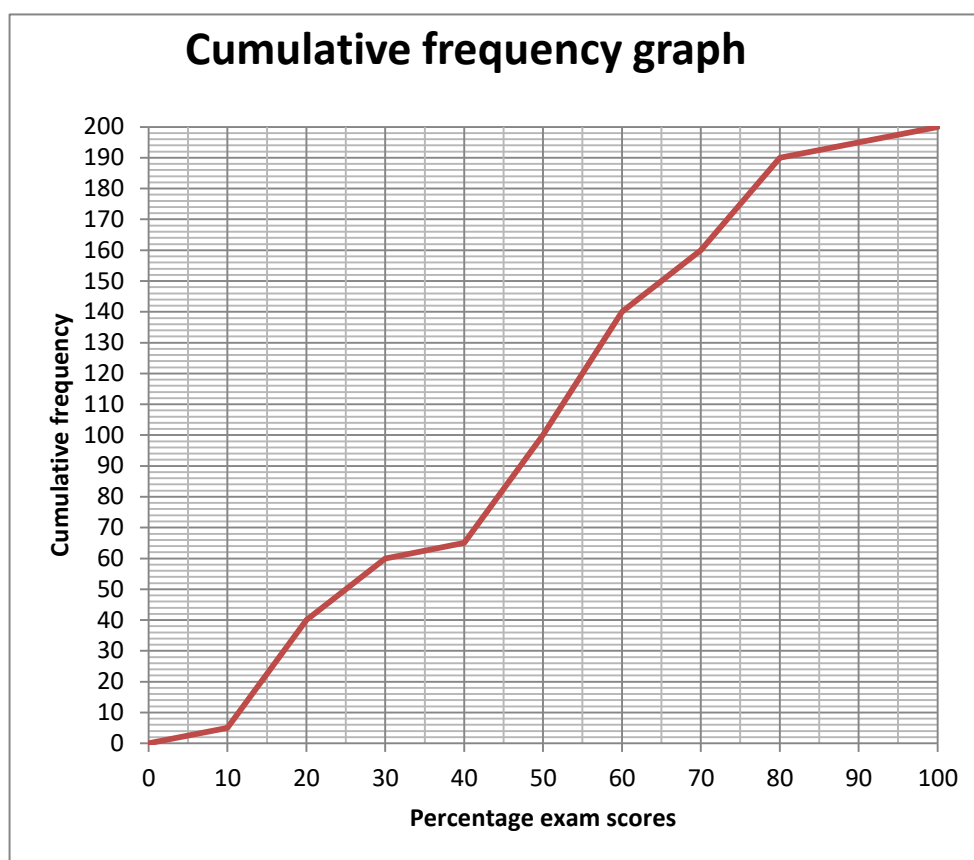
$$m(3m + 2) - 4m(m - 2)$$

- 3 The stem-and-leaf plot shows the number of cigarettes per day previously smoked by the participants of a quit smoking program.

| Stem | Leaf |
|------|---------|
| 0 | 3 7 |
| 1 | 5 |
| 2 | 2 2 3 9 |
| 3 | 5 6 7 |
| 4 | 0 2 |

- a) How many people took part in the program?
- b) What percentage of the participants in this program, previously smoked more than 20 cigarettes per day?
- c) For this data find the:
- i) median number of cigarettes smoked by these participants.
 - ii) interquartile range of cigarettes smoked by these participants.

- 4 The width of a road is measured as 15.3 m wide. What is the percentage error correct to one decimal place of this measurement?
- 5 Rainwater from the roof of a house is collected in a tank beside the house.
- During a storm, 12 mm of rain fell on the roof.
- If the area of the roof is 49 m^2 , how many litres of water collected in the water tank due to the storm?
- 6 What is the surface area of a globe of the world, which has a diameter of 30.4 cm?
- Answer to the nearest square centimetre
- 7 The cumulative frequency graph shown below is for the percentage scores obtained by 200 students in a particular exam.



From the graph determine:

- a) the median b) the 8th decile c) the interquartile range

- 8 Jim drinks a regular cappuccino containing 74 calories.
- Convert this to kJ
 - If walking for 30 minutes uses 530 kJ, how long to the nearest minute would Jim need to walk in order to burn off the energy contained in the cappuccino?
- 9 For this question, you must research two different **new** cars and their prices.
- State the make and model of the two cars that you have chosen and their prices.
(The following website can be used <https://www.drive.com.au>)
 - Choose **one** of the vehicles that you researched in part (a). Assume you have a \$5000 deposit and in order to buy the vehicle you have chosen, you will need to borrow the balance.
After paying the deposit, what is the balance (to the nearest \$1000) needed to buy the car.
 - The loan table below gives monthly repayments per \$1000 borrowed.

| | Monthly Repayment per \$1000 borrowed | | | | | | | | | | |
|------|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Interest rates are per annum | | | | | | | | | | |
| Year | 5% | 6% | 7% | 8% | 9% | 10% | 11% | 12% | 13% | 14% | 15% |
| 1 | \$85.61 | \$86.07 | \$86.53 | \$86.99 | \$87.45 | \$87.92 | \$88.38 | \$88.85 | \$89.32 | \$89.79 | \$90.26 |
| 2 | \$43.87 | \$44.32 | \$44.77 | \$45.23 | \$45.68 | \$46.14 | \$46.61 | \$47.07 | \$47.54 | \$48.01 | \$48.49 |
| 3 | \$29.97 | \$30.42 | \$30.88 | \$31.34 | \$31.80 | \$32.27 | \$32.74 | \$33.21 | \$33.69 | \$34.18 | \$34.67 |
| 4 | \$23.03 | \$23.49 | \$23.95 | \$24.41 | \$24.89 | \$25.36 | \$25.85 | \$26.33 | \$26.83 | \$27.33 | \$27.83 |
| 5 | \$18.87 | \$19.33 | \$19.80 | \$20.28 | \$20.76 | \$21.25 | \$21.74 | \$22.24 | \$22.75 | \$23.27 | \$23.79 |
| 6 | \$16.10 | \$16.57 | \$17.05 | \$17.53 | \$18.03 | \$18.53 | \$19.03 | \$19.55 | \$20.07 | \$20.61 | \$21.15 |
| 7 | \$14.13 | \$14.61 | \$15.09 | \$15.59 | \$16.09 | \$16.60 | \$17.12 | \$17.65 | \$18.19 | \$18.74 | \$19.30 |
| 8 | \$12.66 | \$13.14 | \$13.63 | \$14.14 | \$14.65 | \$15.17 | \$15.71 | \$16.25 | \$16.81 | \$17.37 | \$17.95 |

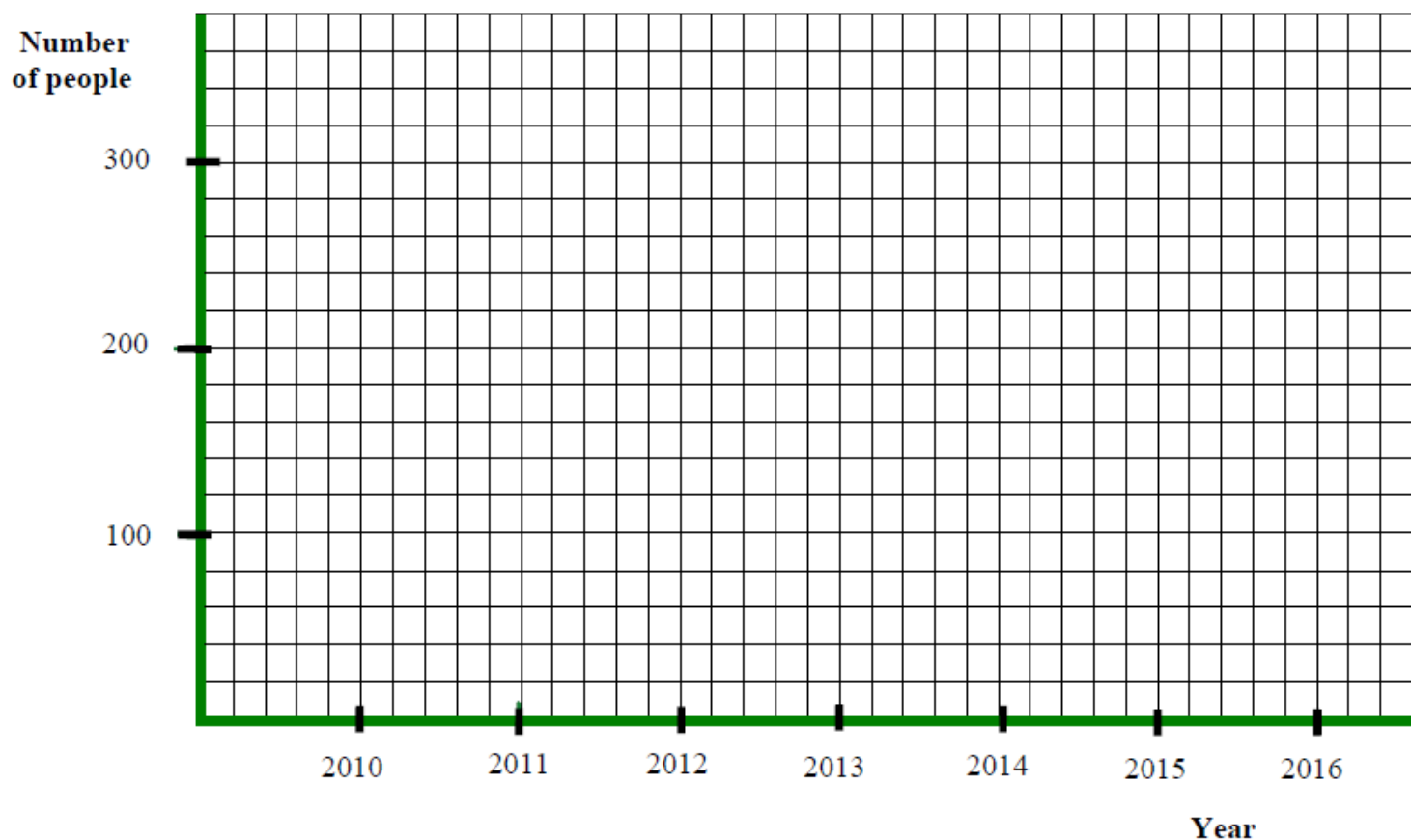
For the car that you have chosen, use the table to calculate the:

- monthly repayment for a 12% p.a. loan over 5 years
- total to be repaid over the period of the loan
- total interest charged over the period of the loan



Grid for question 3f) / Section A (ATTACH TO YOUR ANSWER SHEET) **Name:** _____

Road Fatalities in NSW by Gender 2010 to 2016



Checklist

I have:

- answered all questions on my own paper in my own hand-writing
- written clear working
- attempted all questions
- included all graphs.

If you are unable to complete this task for a specific reason, please contact your teacher to discuss alternative arrangements for demonstrating your skills and knowledge.