Carlingford High School

YEAR 11
MATHEMATICS STANDARD 2
TERM 1 Assessment Task 1
2020

Student number:....................................

- Time allowed: 50 minutes
- Answer all questions in this question booklet. Circle the correct responses to the Multiple Choice Questions on the question sheet.
- Approved calculators may be used.
- All necessary working should be shown in every question. Marks may be deducted for careless or badly arranged work.
- A reference sheet is provided

Question/outcomes	Section A	Section B	Total
Classifying and Representing Data	/23		/23
Formulae and Equations		/25	/25
	/23	/25	/48

Classifying and Representing Data (23 marks)

1. A high school has 100 students in each year group, Year 7 to Year 12. A survey is to be conducted to determine the average number of text messages sent per month by students at the school.

   Which of the following would provide the most representative sample for this survey?

   A. All Year 7 students

   B. All physics students in Year 11 and 12

   C. 20 students chosen at random from each year group

   D. 120 students chosen at random from the school roll

2. A machine produces 6000 items in a week. To obtain a systematic sample of 200, we could start with the 10th item and then select item numbers:

   A. 40, 70, 100, 130, . . .   B. 200, 400, 600, 800, . . .

   C. 100, 190, 280, 370, . . .   D. 210, 410, 610, 810, . . .

3. A school collected data related to the reasons given by students for arriving late. The Pareto chart shows the data collected.
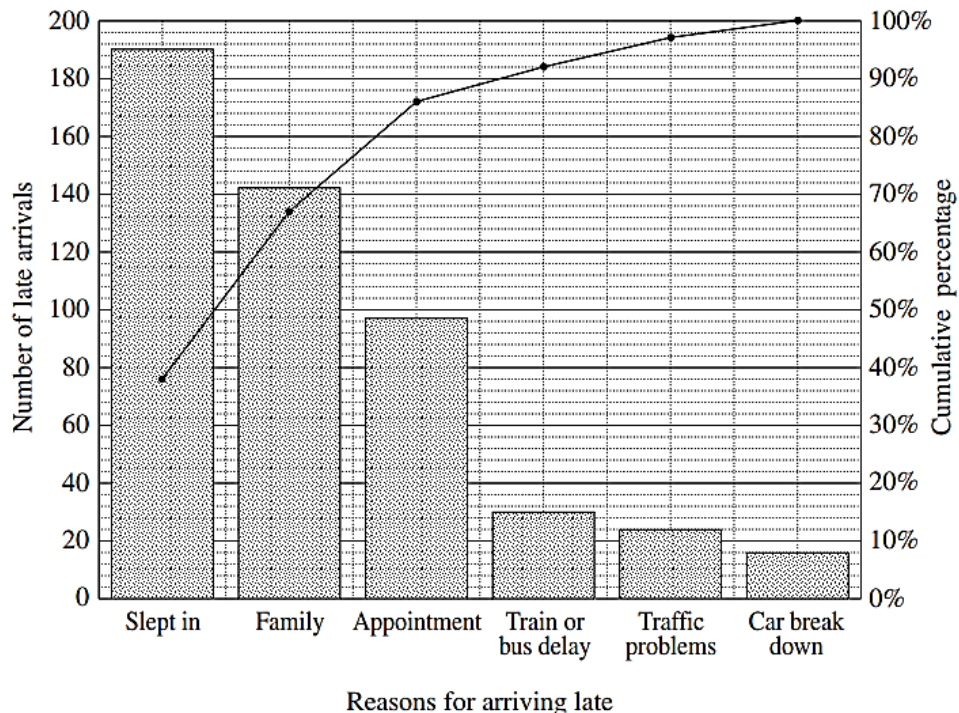

   What percentage of students gave the reason 'Train or bus delay'?

   A. 6%   B. 15%   C. 30%   D. 92%

4. A survey was conducted where people were asked which of two brands of smartphones they preferred. The results were:

• 48% preferred Brand X
• 52% preferred Brand Y

A graph displaying the data is to be included in a magazine article. The editor of the magazine wishes to ensure that the graph is not misleading in any way.

Which graph should the editor choose to include in the article?

(A)

(B)

(C)

(D)
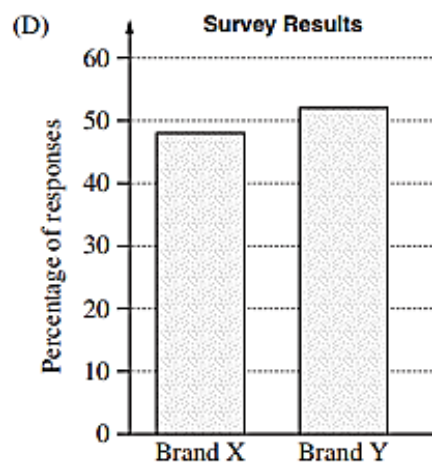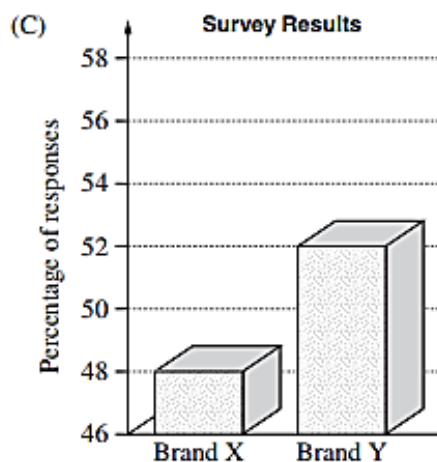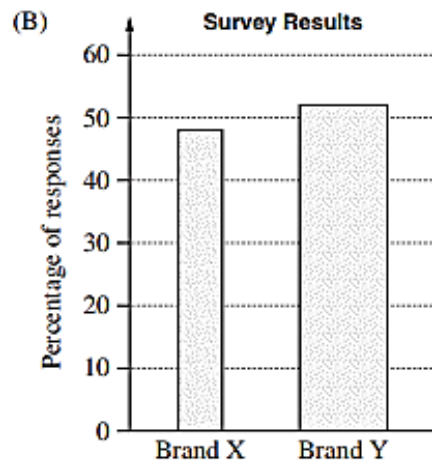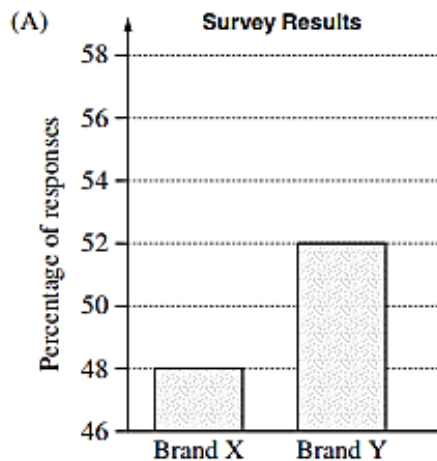
5. Which set of data is classified as categorical and nominal?

A. blue, green, yellow

B. small, medium, large

C. 5.2 cm, 6 cm, 7.21 cm

D. 4 people, 5 people, 9 people

6. The diagram below shows a cumulative frequency histogram.

For the same set of scores, which of the following best represents the frequency histogram?

(A)

(B)

(C)

(D)

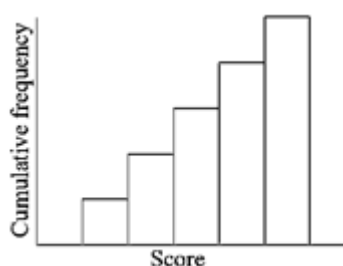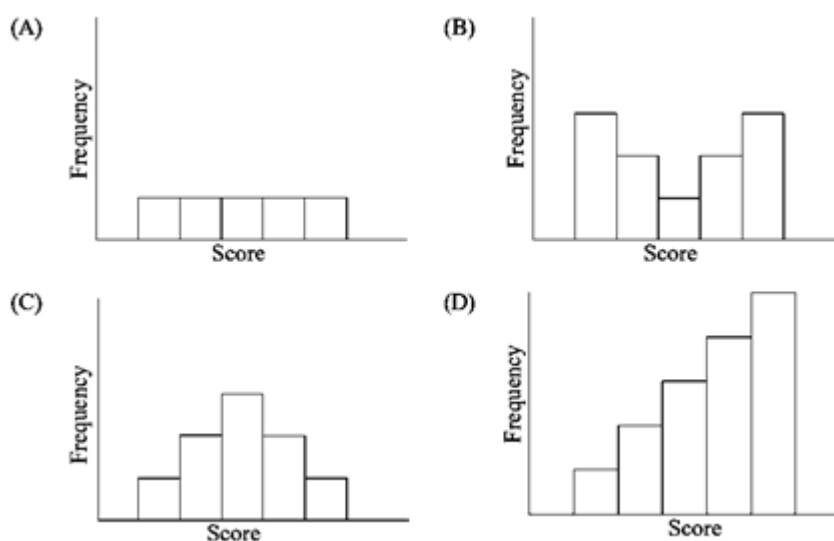7. A new shopping centre has opened near a primary school. A survey is conducted to determine the number of motor vehicles that pass the school each afternoon between 2.30 pm and 4.00 pm.

The results for 60 days have been recorded in the table below.

Score	Class centre	Frequency	Cumulative frequency
100–124	112	10	10
125–149	137	✗	25
150–174	162	20	45
175–199	187	15	60

Find the value of X in the table. [1]

....

8. The stem and leaf plot shows the number of shots needed to complete 25 games of pool on two tables.

Table A		Table B
9 7 6 4	0	6 8 8 9 9
9 8 8 4 1 1	1	2 2 3 5 7
9 8 8 7 7	2	0 2 3 3 4
7 6 6 6 4 2 1	3	1 3 5 7
6 4 2 1	4	0 2 5

a) What is the smallest number of shots needed? [1]

……………………………………………………………………………………

b) For the group of $30 - 39$ shots, what is the value of the product of the class centre and the frequency of the group? [2]

……………………………………………………………………………………

……………………………………………………………………………………

9. The volume of water in a tank changes over six months, as shown in the graph below.

Volume of water in a tank
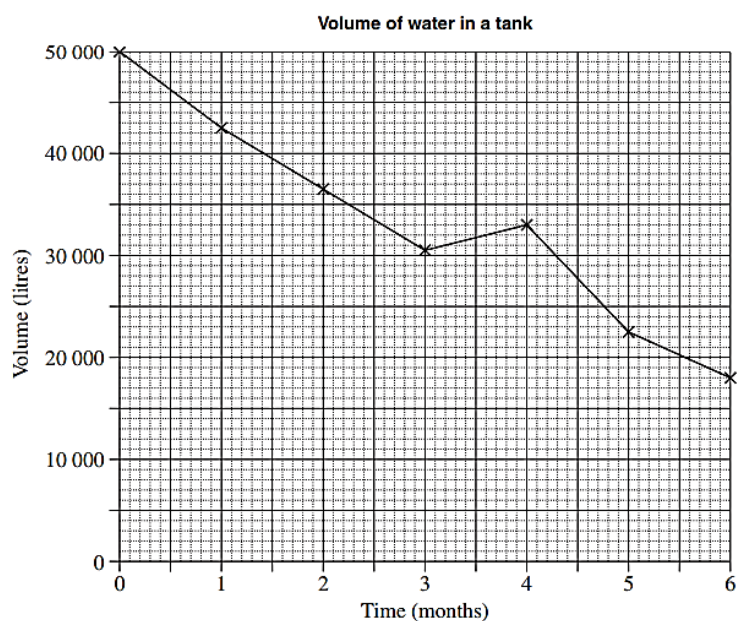
a) What was the initial volume of water in the tank? [1]

……………………………………………………………………………………

b) What is the average decrease in the volume of water during the first 3 months? Answer correct to one decimal place. [2]

……………………………………………………………………………………

……………………………………………………………………………………

10. The ages of a sample of children at a Wiggles concert are displayed in the dot plot below.
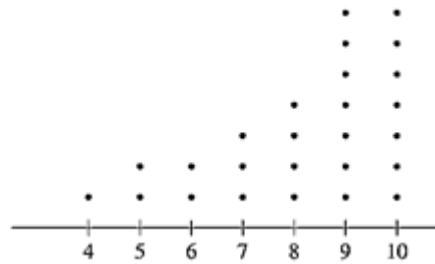
a) How many children were in the sample? [1]

   …………………………………………………………………………………………

b) What fraction of children were over 7 years old? [1]

   …………………………………………………………………………………………

   …………………………………………………………………………………………

11. A census was conducted of the 33 171 households in Carlingford. Each household was asked to indicate the number of cars registered to that household. The results are summarised in the following table.

Number of cars	Frequency
0	2 735
1	12 305
2	13 918
3	3 980
4	233
Total	33 171

a) What is the relative frequency of a household with 1 registered car? [1]

   …………………………………………………………………………………………

b) Parramatta Council issued a 'free parking' sticker for each car registered to a household in Carlingford. How many parking stickers were issued? [2]

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   …………………………………………………………………………………………

   …………………………………………………………………………………………

12. The graph below displays data collected at a school on the number of students in each Year group, who own a mobile phone.

Number of students in Year group
Number of students who own a mobile phone
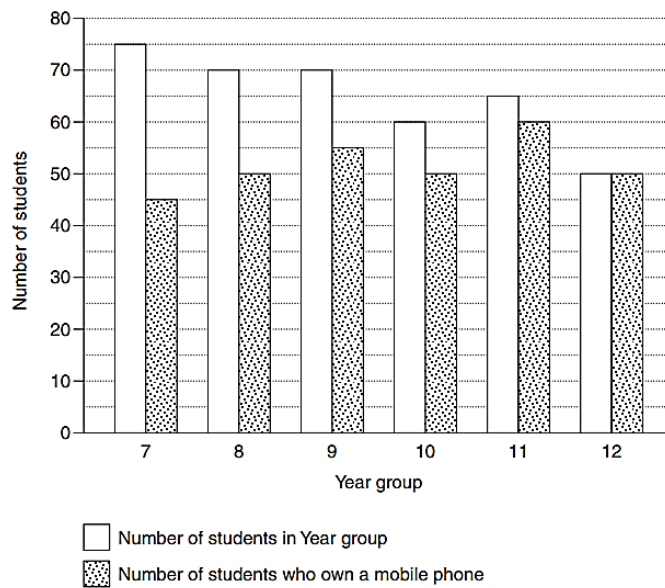
a) Which Year group has the highest percentage of students with mobile phones? [1]

………………………………………………………………………………………

b) Two students are chosen at random, one from Year 9 and one from Year 10. [2]
Which student is more likely to own a mobile phone? Justify your answer with suitable calculations.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

13. In a survey of 200 randomly selected Year 12 students it was found that 180 use social [2]
media.

Based on this survey, approximately how many of 75 000 Year 12 students would be expected to use social media?

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

Formulae and Equations. (25 marks)

1.   Which of the following is the correct simplification of $8x^3 - 5x^3$?

     A. $3x^6$ B. $3x^3$ C. $3x$ D. 3

2.   If $V = \frac{4}{3}\pi r^3$, what is the value of V, correct to two decimal place, when $r = 2$?

     A. 8.38   B. 12.57   C. 25.13   D. 33.51

3.   Solve $2(y + 6) - 4(2y - 1) = 0$

     A. $y = 0.5$ B. $y = 2\frac{2}{3}$ C. $y = 3\frac{1}{3}$ D. $y = 10$

4.   A car is travelling at 95 km/h. How far will it travel in 2 hours and 30 minutes?

     A. $38\ km$ B. $41.3\ km$ C. $218.5\ km$ D. $237.5\ km$

5.   The driving distance from Alex's home to his work is 20 km. He drives to and from work five times each week. His car uses fuel at the rate of $8\ L$ /100 km.

     How much fuel does he use driving to and from work each week?

     A. $16\ L$ B. $20\ L$ C. $25\ L$ D. $40\ L$

6.   Clark's formula is used to determine the dosage of medicine for children.   [2]

$$Dosage = \frac{weight\ in\ kg\ \times adult\ dosage}{70}$$

The adult daily dosage of a medicine contains 3150 mg of a particular drug.
A child who weighs 35 kg is to be given tablets each containing 525 mg of this drug.

How many tablets should this child be given daily?

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

7. To convert a temperature in degrees Fahrenheit, *F*, to a temperature in degrees Celsius, *C*, the formula $F = \dfrac{9C}{5} + 32$ can be used.

a) Calculate the value of *F* when *C* = 45. [1]

………………………………………………………………………………………

………………………………………………………………………………………

b) Tammy is using her grandmother's recipe which requires an oven temperature of 375° F. Tammy's oven measures temperature in degrees Celsius. [2]

At what temperature, to the nearest degree, should Tammy set her oven, to the nearest whole number?

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

8. Sophie is driving at 70 km/h. She notices a branch on the road ahead and decides to apply the brakes. Her reaction time is 1.5 seconds. Her braking distance (*D* metres) is given by $D = 0.01v^2$, where v is speed in km/h. [3]

Stopping distance can be calculated using the following formula:

$$stopping\ distance = (reaction - time\ distance) + (braking\ distance)$$

Calculate Sophie's stopping distance. Answer correct to the nearest metre.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

9. Re-write the equation $4x + 2y = 15$ with y as the subject. [2]

………………………………………………………………………….………..………

………………………………….…………….………..………………………….………..………

………………………………………………….………..………………………….………..………

………………………………………………….………..………………………….………..………

………………………………………………….………..………………………….………..………

………………………………………………….………..………………………….………..………

10.. Solve the following completely: (6 marks)

a) $3x - 9 = 3$

b) $\frac{x}{2} + 3 = 8$

c) $\frac{4x+2}{6} = -2$

d) $3x + 9 = 4 - 2x$

11. The formula below is used to calculate an estimate for blood alcohol content (BAC) for females. [4]

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

The number of hours required for a person to reach zero BAC after they stop consuming alcohol is given by the following formula.

$$Time = \frac{BAC}{0.015}$$

The number of standard drinks in a glass of wine and a glass of spirits is shown.

Wine
1.2 standard drinks

Spirits
1 standard drink
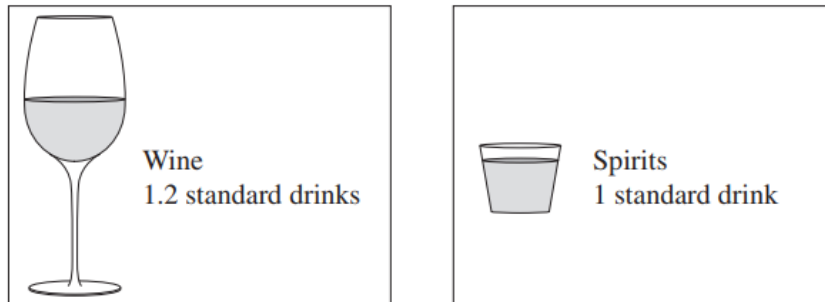
Hannah weighs 60 kg. She consumed 3 glasses of wine and 4 glasses of spirits between 6:15 pm and 12:30 am the following day. She then stopped drinking alcohol.

Using the given formulae, calculate the time in the morning when Hannah's BAC should reach zero.

....

....

....

....

....

....

....

....

....

....

End of Exam