

Carlingford High School

Preliminary Yearly Examination 2018

Mathematics Standard

Student Number

SOLUTIONS

Teacher _____

Section I – Multiple Choice Answer Sheet

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
A B C D

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.

A B ^{correct} C D

- | | | | | |
|-----|------------------------------------|------------------------------------|------------------------------------|---|
| 1. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>C Data</i> |
| 2. | A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> <i>EM</i> |
| 3. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>M+E</i> |
| 4. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>C Data</i> |
| 5. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>M+E</i> |
| 6. | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> <i>I+D</i> |
| 7. | A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> <i>C Data</i> |
| 8. | A <input type="radio"/> | B <input checked="" type="radio"/> | C <input type="radio"/> | D <input type="radio"/> <i>M+E</i> |
| 9. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>Prob</i> |
| 10. | A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> <i>I+D</i> |

REFERENCE SHEET

Measurement

Precision

$$\text{Absolute error} = \frac{1}{2} \times \text{precision}$$

Upper bound = measurement + absolute error

Lower bound = measurement - absolute error

Length, area, surface area and volume

$$l = \frac{\theta}{360} \times 2\pi r$$

$$A = \frac{\theta}{360} \times \pi r^2$$

$$A = \frac{h}{2}(x + y)$$

$$A \approx \frac{h}{2}(d_f + d_l)$$

$$A = 2\pi r^2 + 2\pi rh$$

$$A = 4\pi r^2$$

$$V = \frac{1}{3}Ah$$

$$V = \frac{4}{3}\pi r^3$$

Trigonometry

$$A = \frac{1}{2}ab \sin C$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

Financial Mathematics

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

Straight-line method of depreciation

$$S = V_0 - Dn$$

Declining-balance method of depreciation

$$S = V_0(1-r)^n$$

Statistical Analysis

$$z = \frac{x - \bar{x}}{s}$$

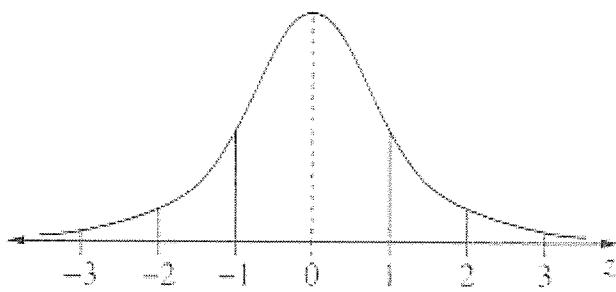
An outlier is a score

less than $Q_1 - 1.5 \times IQR$

or

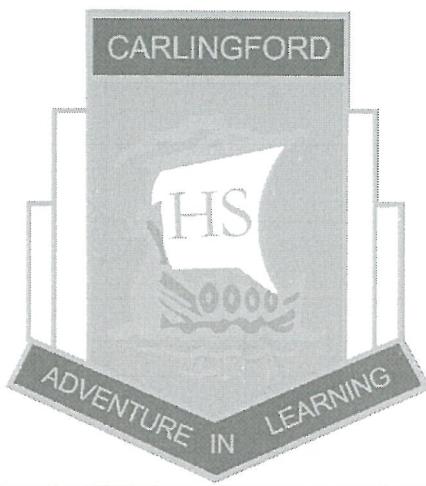
more than $Q_3 + 1.5 \times IQR$

Normal distribution



- approximately 68% of scores have z-scores between -1 and 1
- approximately 95% of scores have z-scores between -2 and 2
- approximately 99.7% of scores have z-scores between -3 and 3





2018
PRELIMINARY YEARLY
EXAMINATION

Mathematics Standard

General Instructions

- Working time – 2 hours
- Write using black pen
- Approved calculators may be used
- A reference sheet is provided at the back of this paper
- Show ALL relevant mathematical reasoning and/or calculations

Student Number: SOLUTIONS

	Earning Money	Measurement	Formulae & Equations	Classifying & Representing Data	Measurement & Energy	Relative Frequency & Probability	Linear Relationships	Interest & Depreciation	Exploring & Describing Data	Working with Time	TOTAL
Multiple Choice	Q2 /1			Q1, 4, 7 /3	Q3, 5, 8 /3	Q9 /1		Q6, 10 /2			/10
Q11			/4								/4
Q12		/2									/2
Q13			/2								/2
Q14			/4								/4
Q15									/3		/3
Q16		/4									/4
Q17						/8					/8
Q18			/4								/4
Q19				/3							/3
Q20					/2						/2
Q21								/3			/3
Q22	/6										/6
Q23			/3						/3		/6
Q24						/2				/3	/5
Q25		/4									/4
Q26									/4		/4
Q27											/4
Q28		/3									/3
Q29											/6
TOTAL	/7	/13	/15	/8	/5	/11	/7	/11	/7	/3	/87

Section I

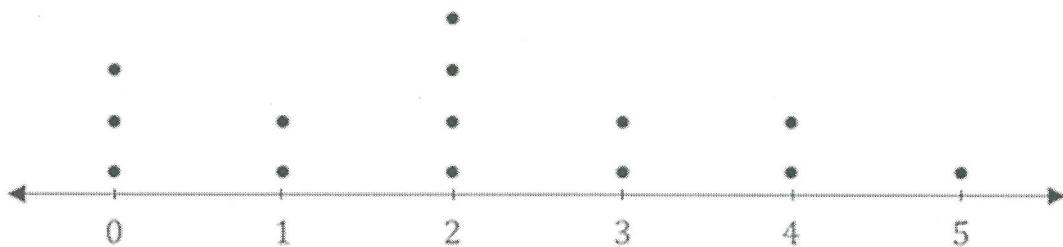
10 marks

Attempt Questions 1 – 10.

Allow about 20 minutes for this section.

Use the multiple-choice answer sheet for Questions 1 – 10.

1. A sample of 14 people were asked to indicate the time (in hours) they had spent watching television on the previous night. The results are displayed in the dot plot below.



What is the mean and sample standard deviation of these times? Answer correct to one decimal place.

- (A) $\bar{x} = 2.0$ and $s = 1.5$
(B) $\bar{x} = 2.1$ and $s = 1.5$
(C) $\bar{x} = 2.1$ and $s = 1.6$
(D) $\bar{x} = 2.6$ and $s = 1.2$
2. A real estate agent is paid \$500 a week plus a 6.5% commission on sales exceeding \$650 000. What commission is made by the agent who sells a property for \$775 000?
(A) \$8125
(B) \$8625
(C) \$42 250
(D) \$50 375
3. The length of a dragonfly is measured to be 4.9×10^{-2} metres. **0.049m**
What measurement is equivalent to this?
 4.9cm
(A) 0.49 mm
(B) 4.9 mm
(C) 4.9 cm
(D) 49 cm

4. In order to test the reliability of light globes produced in a factory, a quality control engineer would most likely use which of the following samples?

- (A) Random
(B) Stratified
(C) Systematic
(D) Self-selected

5. The table below was published by a health club to give its members an idea of the benefits of various exercise activities.

Activity	Mass		
	60 kg	80 kg	100 kg
Walking— Moderate Intensity	903 kJ <i>A: 1806</i>	1204 kJ	1505 kJ
Walking— High Intensity	1204 kJ	1605 kJ	2006 kJ
Cycling – Moderate Intensity	2104 kJ	2809 kJ	3511 kJ
Cycling – High Intensity	2709 kJ	3612 kJ	4514 kJ
Swimming— Moderate Intensity	2257 kJ	3010 kJ	3762 kJ
Swimming— High Intensity	3008 kJ <i>G: 2006</i>	4012 kJ	5014 kJ

Amanda (mass 60 kg) walks at a moderate intensity for two hours while Georgia (mass 80 kg) swims at a high intensity for 30 minutes.

Which statement is true?

- (A) Amanda burned 600 more kilojoules than Georgia.
(B) Amanda burned 200 more kilojoules than Georgia.
(C) Georgia burned 200 more kilojoules than Amanda.
(D) Georgia burned 600 more kilojoules than Amanda.

6. A landscaper quoted \$300, excluding GST to complete a job. A GST of 10% is added to the price. What is the full price for the job?

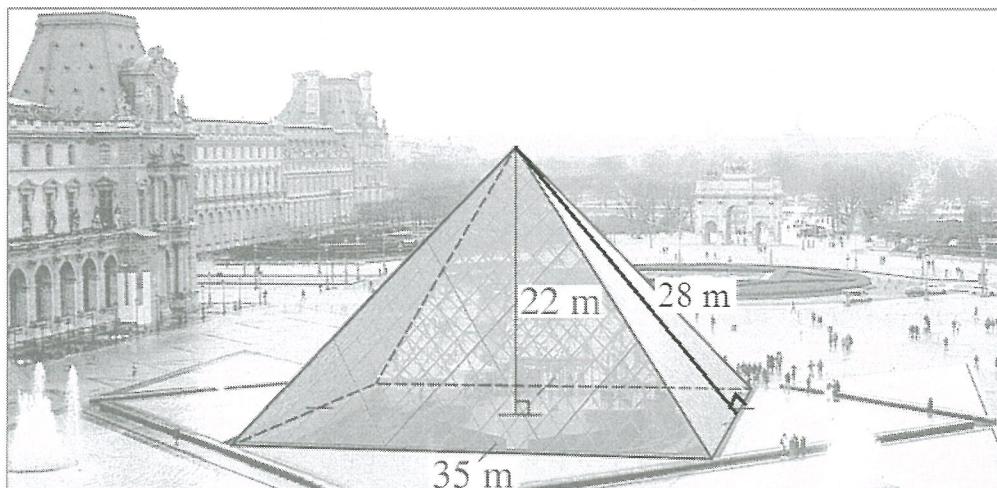
- (A) \$30
(B) \$303
(C) \$310
(D) \$330

7. In each of the following a website asks for two data entries.

Which website is asking you to enter two continuous numerical variables?

- (A) A health site asks for your weight and height.
(B) A shopping site asks for your shoe size and shirt size.
(C) A social media site asks for your eye colour and age.
(D) A social services site asks for your age and number of children.

8. The Louvre Pyramid in Paris has a square base with side length 35 m, a perpendicular height of 22 m and a slant height of 28m.



What is the surface area of the pyramid?

$$SA = \left(4 \times \frac{1}{2} \times 35 \times 28\right) + 35^2$$

- (A) 8983 m^2
(B) 3185 m^2
(C) 26950 m^2
(D) 2765 m^2

9. The frequency of an event is 6 and the total number of frequencies is 20. What is the relative frequency?

(A) 14%

(B) 26%

(C) 30%

(D) 70%

10. Oliver bought a vintage car for \$12 500 and spent \$7 500 on making improvements to it. He then sold it for \$32 500.

What percentage profit did he make, based on his total costs?

(A) 38.5%

(B) 60%

(C) 62.5%

(D) 100%

Question 11

(a) Simplify: $12x^3 - 9x^3 + 2x^2$

1

$3x^3 + 2x^2$

(b) Solve the following equations:

(i) $2x + 7 = -10$

1

$$\begin{array}{r} -7 \quad -7 \\ \hline 2x = -17 \\ \hline 2 \quad 2 \end{array}$$

$x = -8\frac{1}{2}$

(ii) $2(3 - 5x) = 6x - 26$

2

$$\begin{array}{r} 6 - 10x = 6x - 26 \\ +26 +10x \quad +10x +26 \\ \hline \end{array}$$

① 1 step

$$\begin{array}{l} \rightarrow 6 - 10x = 6x - 26 \\ \rightarrow 3 - 5x = 3x - 13 \end{array}$$

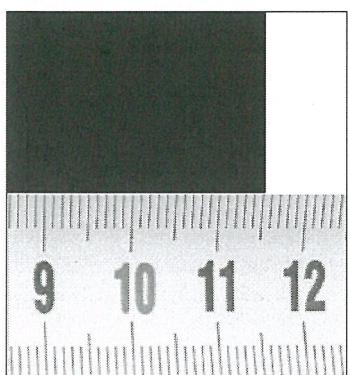
$$\begin{array}{r} 32 = 16x \\ 16 \quad 16 \end{array}$$

$x = 2$

① $x=2$
or CFE with
Correct working

Question 12

Morgan uses a tape measure and records the width of a black rectangle to be 11.5 cm.
The diagram below shows a closeup of the tape measure and the rectangle.



- (a) What is the absolute error in using this tape measure? 1

$$\text{absolute error} = \pm 0.5 \text{ mm} \quad \textcircled{1} \text{ must have } \pm$$

- (b) What is the percentage error in finding the width of the black rectangle (correct to one decimal place)? 1

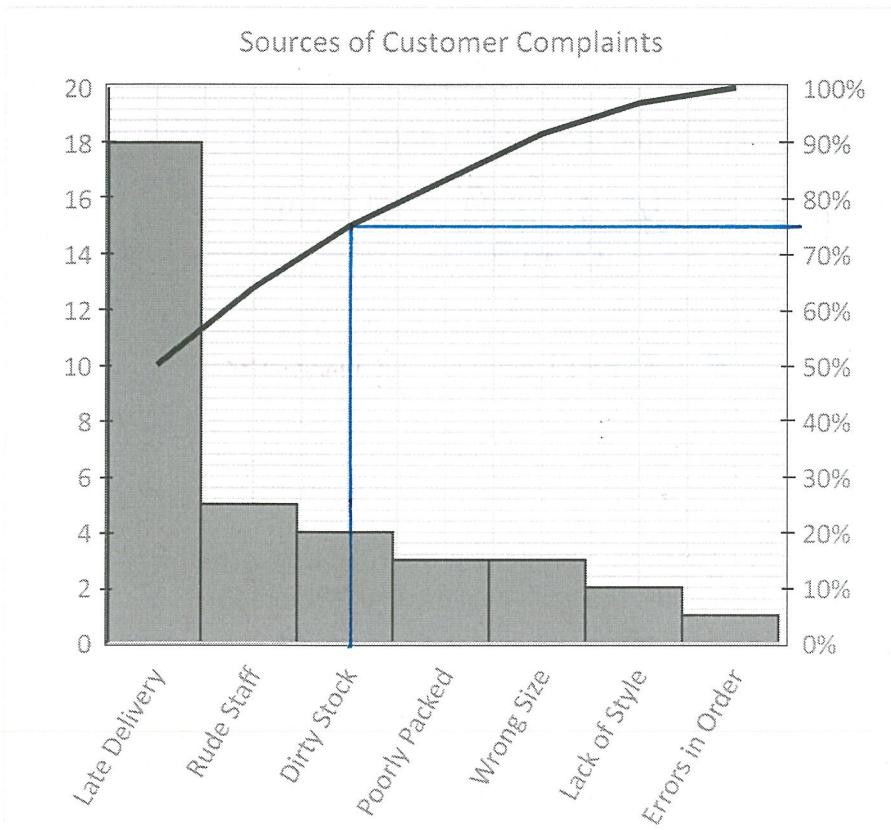
$$\% \text{ error} = \frac{\pm 0.5}{11.5} \times 100$$

CFE for \pm

$$\begin{aligned} \textcircled{1} \text{ either answer} &= \pm 0.434782\ldots \% \\ \text{or correct rounding} &= \pm 0.4\% \end{aligned}$$

Question 13

The Pareto Chart below was constructed to analyse the complaints received by a phone and online clothing retailer.



- (a) If the retailer wanted to address the issues which caused 75% of the complaints, which areas should they address first? 1

Late delivery, Rude staff, Dirty stock

① must have all 3.

- (b) If they only addressed errors in orders, what percentage of complaints would be addressed? Give your answer to the nearest whole number. 1

$$\text{error complaints} = \frac{1}{36} \times 100$$

① either correct answer.

$$[= 2.\dot{7}\%. \\ [= 3\%]$$

Question 14

- (a) Paul uses Young's formula to calculate a six-year-old child's dose of Geritol.

2

$$\text{Young's Formula : Dosage for child 1-12} = \frac{\text{age of child (in years)} \times \text{adult dose}}{\text{age of child (in years)} + 12}$$

Given the adult dosage of Geritol is 24 mL, what is the child's dose?

$$\text{Dosage byrs} = \frac{6 \times 24}{6+12} \quad \textcircled{1} \text{ sub}$$

$$= 8 \text{ mL} \quad \textcircled{1} \text{ Answer}$$

- (b) Ryan is driving at a speed of 60 km/h and sees a fallen tree branch on the road 80 metres ahead. His reaction time is 3 seconds before he applies the car's brakes. The formula for stopping distance is:

$$d = \frac{5Vt}{18} + \frac{V^2}{170}$$

How far is Ryan from the tree branch? Answer correct to the nearest whole metre.

$$d = \frac{5 \times 60 \times 3}{18} + \frac{60^2}{170}$$

$$= 71.17647059\dots$$

$$d = 71 \text{ m} \quad \textcircled{1} \text{ 71m}$$

$$\text{distance from tree} = 80 - 71$$

$$= 9 \text{ m}$$

Ryan is 9m from the tree branch $\textcircled{1}$ 9m

When he stops.

or CFE
with correct
working.
ie. $80 - 70$
 $= 10 \text{ m}$

Question 15

A company bought a new copier for \$25 400.

The copier loses 16% of its value in the first year and continues to depreciate using the straight-line method.

- (a) Find the amount of depreciation.

1

$$\text{depreciation} = 25400 \times 16\% \\ = 4064$$

- (b) The copier will be replaced when its value falls below \$10 000. $S = V_0 - Dn$

2

How many years will the copier be retained?

$$10000 = 25400 - 4064n$$

$$10000 - 25400 = -4064n$$

$$n = \frac{-15400}{-4064}$$

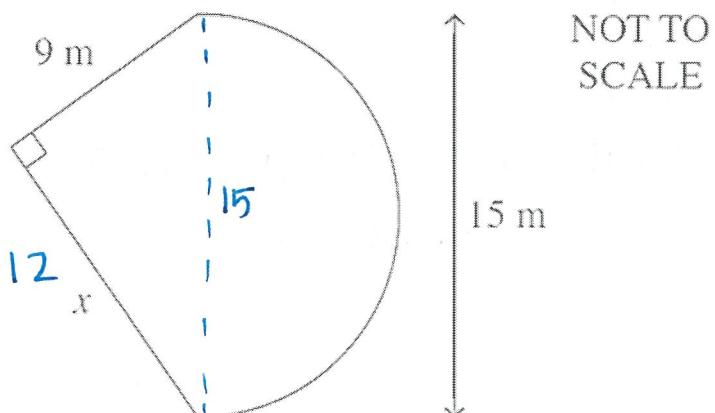
$$n = 3.7893\dots$$

① 3.7893... or CFE with Working Show

The copier will be kept for 4 years.
① 4

Question 16

The diagram shows a swimming pool design consisting of a semicircle and right triangle. The length of the pool is 15 m and one of the straight sides is 9 m.



- (a) Find the length of the straight side marked x .

1

$$\begin{aligned}x^2 &= 15^2 - 9^2 \\x &= \sqrt{15^2 - 9^2} \\x &= 12\text{m}\end{aligned}$$

- (b) Find the perimeter of the swimming pool. Give your answer correct to 3 significant figures.

3

$$\begin{aligned}\text{perimeter} &= 9 + 12 + \left(\frac{1}{2} \times 2 \times \pi \times 7.5\right) \textcircled{1} \\&= 44.5619449\dots \textcircled{1} \\&= 44.6\text{m (3 sig fig)} \textcircled{1} \text{ Must show to 3 sig fig}\end{aligned}$$

Question 17

- (a) Jessica randomly chooses one chess piece from a bag which contains the following pieces:

- 1 king.
- 2 rooks.
- 2 knights.
- 1 queen.
- 2 bishops.
- 4 pawns.

What is the probability that she doesn't choose a pawn?

1

$$P(\text{not pawn}) = \frac{8}{12}$$

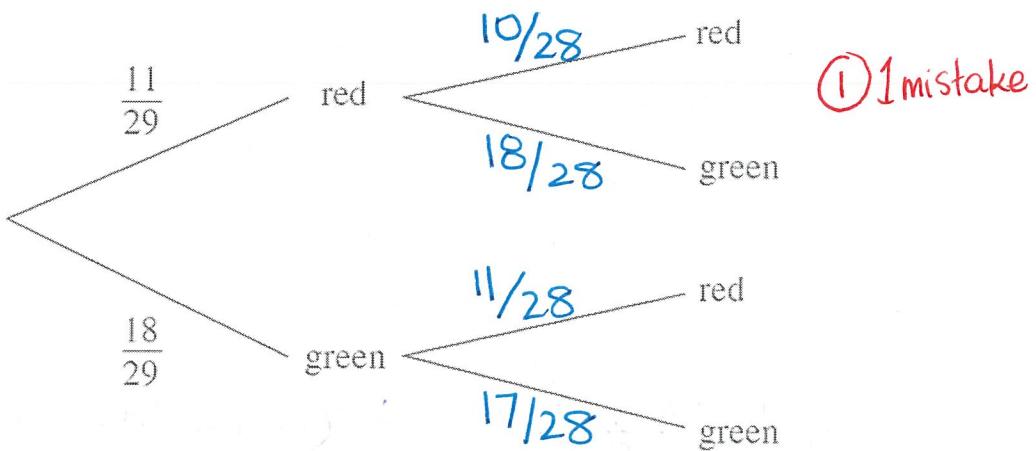
① either fraction

$$= \frac{2}{3}$$

- (b) A box contains 29 coloured balls. There are 11 red balls and 18 green balls. 2 balls are selected from the box at random.

- (i) Complete the probability tree diagram.

2



- (ii) Calculate the probability of selecting 2 red balls.

1

$$P(RR) = \frac{11}{29} \times \frac{10}{28}$$

$$= \frac{55}{406}$$

CFM from diagram with working

- (iii) Calculate the probability of selecting at least 1 red ball.

1

$$\begin{aligned} P(\text{at least 1 red}) &= \left(\frac{11}{29} \times \frac{10}{28}\right) + \left(\frac{11}{29} \times \frac{18}{28}\right) + \left(\frac{18}{29} \times \frac{11}{28}\right) \\ &= \frac{253}{406} \end{aligned}$$

- (c) A company has a board of directors which has seven members whose surnames are Archer, Browne, Carlisle, Durie, Evans, Falconer and Green.

- (i) The members of the board are asked to stand in a line to have a photograph taken.
In how many different orders could the board members stand in line?

$$7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$$

- (ii) All of the board members want to attend a conference, but only two can go.
The names of all members are placed in a hat and two are drawn out at random.
What is the probability that Browne and Green are chosen to attend?

$$7 \times 6 = 42 \text{ (1) or } 21 \text{ if doubles removed} \quad \frac{7 \times 6}{2 \times 1} \text{ not } \frac{7 \times 6}{2!}$$

$$P(BG) = \frac{2}{42} \quad (BG/GB)$$

$$= \frac{1}{21} \quad (1) \text{ either } \frac{2}{42} \text{ or } \frac{1}{21}$$

Question 18

Kate shares a bottle of wine over a dinner which lasts 2 hours. Kate weighs 70 kg.

The formula for calculating BAC is given as $BAC_{\text{female}} = \frac{10N - 7.5H}{5.5M}$

- (a) Kate has three standard drinks from the bottle of wine.

2

Calculate her BAC at the end of this dinner. Give your answer correct to 2 decimal places.

$$BAC = \frac{10 \times 3 - 7.5 \times 2}{5.5 \times 70} \quad (1) \text{ substitution}$$

$$= 0.03896103896\dots$$

$$= 0.04 \text{ (2dp)} \quad (1) \text{ Correct rounding 2dp.}$$

- (b) To estimate how long it takes for the BAC to return to zero after the last drink, you can divide the BAC by 0.015.

2

How long after she finishes drinking, would Kate's BAC return to zero? Give your answer in hours and minutes.

$$BAC \text{ zero} = \frac{0.04}{0.015}$$

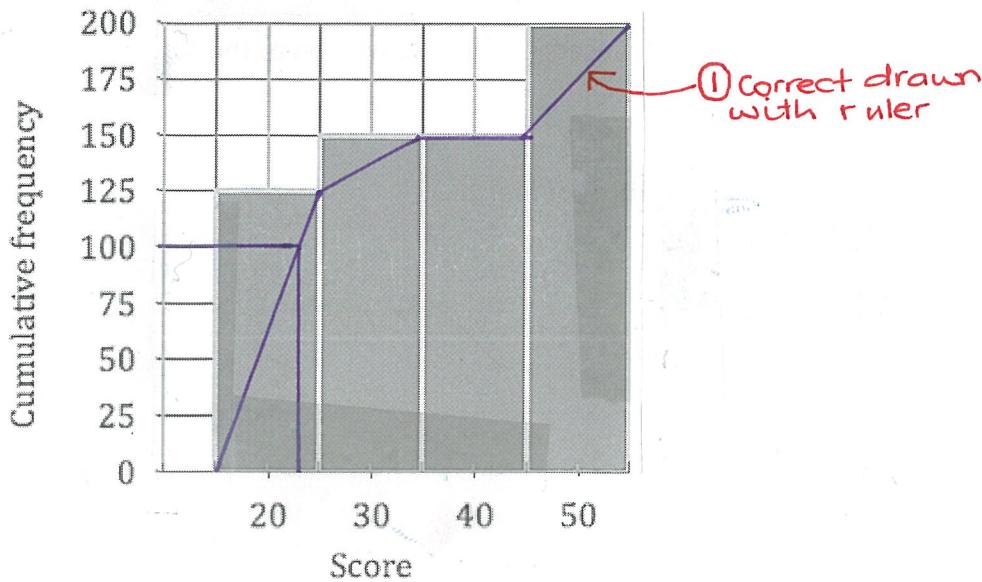
$$= 2.66 \dots \quad (1) \text{ cfm if working shown}$$

$$= 2 \text{ hours } 40 \text{ minutes.} \quad (1) \text{ hours + minutes no seconds.}$$

$$\frac{\text{calculator}}{0.015} = 2h 36mins \quad 14$$

Question 19

A cumulative frequency histogram is shown below.



- (a) What is the modal score?

1

20

- (b) Draw the ogive on the graph above

1

- (c) What is the median score?

1

20

Question 20

Harrison uses a 600 W heater for a total of 25 hours during the week. What is the cost of using the heater for a week if electricity is \$0.2248 per kWh?

$$\text{electricity cost} = \frac{600}{1000} \times 25 \times 0.2248$$

2

① $\div 1000$ (kW)

$$= 3.372$$

$$= \$3.37 \text{ ①}$$

Question 21

The amount of fuel used by an engine varies directly with the time that the engine has been running.

Using t for the running time and A for the amount of fuel used, this can be written as the equation $A = kt$, where k is a constant.

- (a) When the engine runs for 2.5 hours it uses 16 litres of fuel.

2

Find the value of k .

$$16 = 2.5k \quad (1)$$

$$k = 6.4 \quad (1)$$

- (b) On one day the engine had been running for 7 hours.

1

Calculate the amount of fuel that it used.

$$A = 6.4t$$

$$A = 6.4 \times 7$$

$$= 44.8 \text{ L} \quad (1) \quad \text{CFM with correct working shown}$$

Question 22

Samuel is a casual employee at a local store and is paid at the following rates:

Weekday rate	\$18 per hour
Saturday rate	Time-and-a-half

The table below shows Samuel's timesheet for last week.

	Start	Finish	Unpaid break	
Friday	7:00 am	2:30 pm	30 minutes	7h
Saturday	9:00 am	5:00 pm	1 hour	7h

- (a) Calculate Samuel's gross pay for last week.

2

$$\text{Gross pay} = (7 \times 18) + (7 \times 1.5 \times 18)$$

$$= 315$$

Samuel's gross pay was \$315

- (b) Samuel's employer withholds 20% of his weekly earnings as PAYE tax. Calculate Samuel's PAYE tax for last week.

1

$$\text{PAYE} = 315 \times 20\%$$

$$= \$63$$

① CFM if 20% of (a) shown

Samuel earned a gross income of \$63 000 this year. He has allowable deductions of \$4500 and work related expenses of \$1100. Use the table below to answer the following questions.

Taxable income	Tax payable
0 – \$18 200	Nil
\$18 201 – \$37 000	Nil + 19 cents for each \$1 over \$18 200
\$37 001 – \$87 000	\$3572 + 32.5 cents for each \$1 over \$37 000
\$87 001 – \$180 000	\$19 822 + 37 cents for each \$1 over \$87 000
\$180 001 and over	\$54 232 + 45 cents for each \$1 over \$180 000

- (c) What was Samuel's taxable income?

1

$$\text{Taxable Income} = 63000 - 4500 - 1100$$

$$= 57400$$

- (d) Calculate the amount of tax payable.

2

$$\text{Tax Payable} = 3572 + [(57400 - 37000) \times 0.325]$$

$$= 3572 + 6630$$

$$= \$10 202$$

① or 20400×0.325

Question 23

- (a) The number of students absent from year 11 for the past nine days was as follows:
19, 20, 15, 14, 31, 17, 20, 16, 22

- (i) Calculate the interquartile range

1

$$\begin{aligned} IQR &= 21 - 15.5 \\ &= 5.5 \end{aligned}$$

- (ii) Is 31 an outlier for this set of data?

2

Justify your answer with calculations.

$$\begin{aligned} \text{Outlier} &= 21 + (1.5 \times 5.5) \\ &= 29.25 \end{aligned}$$

① Calculation of outlier

① statement showing > or greater than

$31 > 29.25$ therefore 31 is an outlier for the data set.

- (b) A plane travelled non-stop from London to Sydney, a distance of 17 850 km, in 20 h and 9 min. The plane started with 184 tonnes of fuel, and on landing had enough fuel in reserve to fly another 55 minutes.

$$s = \frac{d}{t}$$

- (i) What was the plane's average speed in kilometres per hour?

1

$$\text{Speed} = \frac{17850}{20.9}$$

$$= 885.86 \text{ km/h} \quad (2 \text{ dp}) \quad \text{① Any correct rounding}$$

- (ii) How much fuel was used, to the nearest tonne?

[20 h 9 m + 55 min]

2

$$\text{total d} = \text{Speed} \times \text{total time} = 885.86 \times 21.4$$

$$= 18662.03474 \text{ km} \quad \text{①}$$

$$\text{average fuel} = 18662.03474 \dots$$

$$\begin{aligned} \text{total fuel used} &= \text{average}^{184} \times \text{flight distance} \\ &= 0.0098595894 \times 17850 \end{aligned}$$

$$\begin{cases} = 175.9936 \dots \\ = 176 \text{ tonnes (nearest whole)} \end{cases}$$

① any either correct answer

Question 24

- (a) Approximately 9% of Australia's population have O negative blood.

2

35% of these people regularly donate blood.

At a medical clinic where 450 people donated blood on a particular day, how many of these people would be expected to have O negative blood?

$$\text{O negative} = (450 \times 9\%) \times 35\% \\ = 14.175$$

14 people would be expected to have O⁻ blood.

- (b) Part of a timetable for the Blue Mountains train line is shown below.

Station	pm	pm	pm	pm	pm
Katoomba	8:15	9:09	10:15	10:29	11:29
Leura	8:25	9:19	--	10:39	11:39
Wentworth Falls	8:33	9:27	--	10:47	11:47
Lawson	8:45	9:39	--	10:59	11:59
Hazelbrook	8:52	9:46	--	11:06	12:06
Woodford	8:59	9:53	--	11:13	12:13
Linden	8:04	--	--	11:18	--
Faulconbridge	9:10	10:00	--	11:22	12:20
Springwood	9:15	10:05	11:00	11:28	12:25
Valley Heights	9:21	10:11	--	--	12:31
Blaxland	9:27	10:18	--	11:37	12:37
Glenbrook	9:33	11:23	--	11:43	12:43
Lapstone	9:40	11:30	--	11:50	12:50
Emu Plains	9:47	10:38	--	11:57	12:57
Penrith	9:55	10:45	11:25	12:05	01:05

- (i) Jim wants to catch a train at Springwood to get to Penrith before 11:15 pm.

1

What is the latest time he can catch his train?

10:05pm

- (ii) The express train from Katoomba leaves at 10:15pm and arrives at Penrith at 11:25.

2

How much shorter is this trip compared to the all stations train?

$$\text{All stations} = 9:55 - 8:15 = 1\text{h } 40\text{min}$$

① All stations
or Express
working

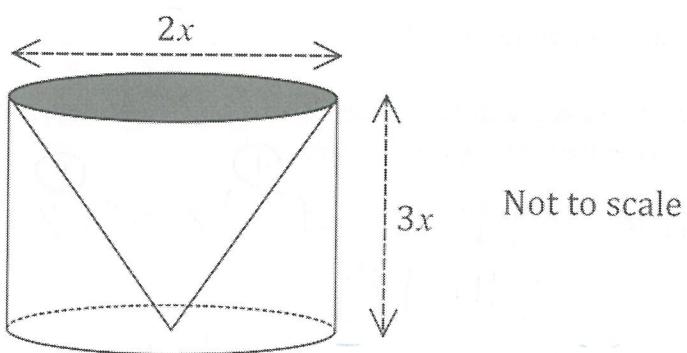
$$\text{Express} = 11:25 - 10:15 = 1\text{h } 10\text{min}$$

difference = 30mins

The express train is 30 minutes shorter ① 30mins

Question 25

A cone is placed inside a cylinder of exactly the same diameter and height.



- (i) Show that the volume of the cylinder is $3\pi x^3$.

$$V = \pi \times r^2 \times h$$

$$V = \pi \times x^2 \times 3x$$

$$\therefore V = 3\pi x^3$$

$$r = \frac{2x}{2} = x$$

①

Give reasons =
show ALL
working
must show
 $V = \pi r^2 h$
and substitution

1

- (ii) Write a similar expression for the volume of the cone.

$$V = \frac{1}{3}\pi \times 3x^3$$

$$V = \frac{1}{3}\pi x^3$$

1

- (iii) What fraction of the cylinder's volume is the cone?

$$\frac{1}{3}$$

1

- (iv) Initially, the cylinder is filled to capacity with 240 litres of water. When the cone is carefully placed inside the cylinder, some of the water is displaced and spills out. What volume of water remains in the cylinder?

$$\begin{aligned} \text{volume of water} &= 240 \times \frac{2}{3} \\ &= 160 \text{ L} \end{aligned}$$

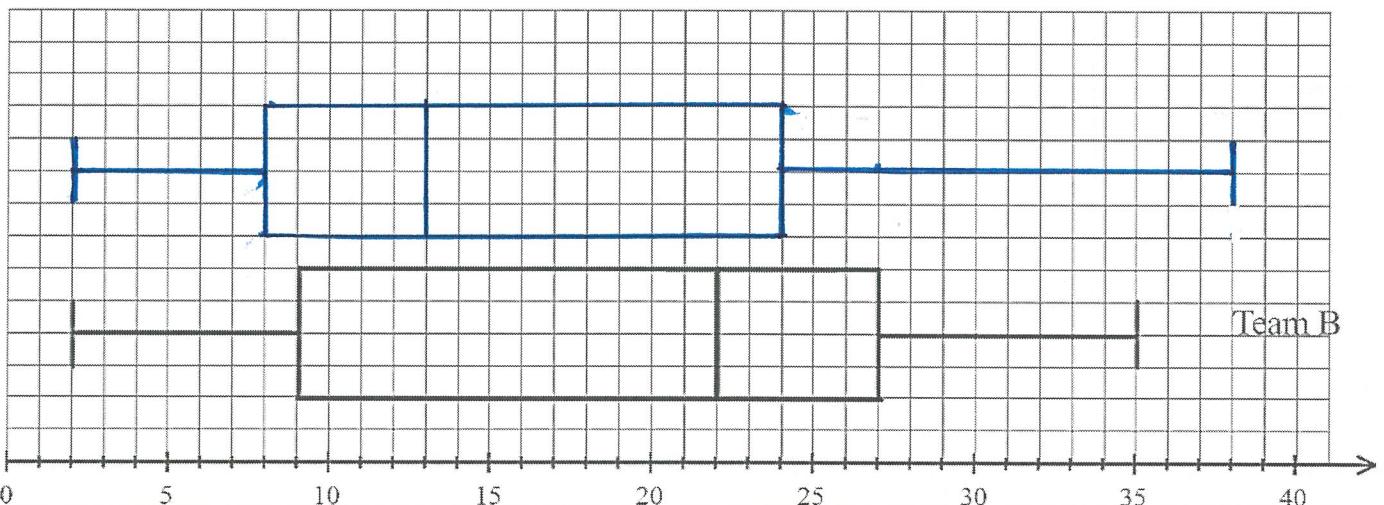
1

Question 26

There were two teams competing to represent NSW in the sport of Farnarkling. Data was collected on the points scored by the two teams in their last 20 games. The results for Team A are shown in the five-number summary below.

2, 8, 13, 24, 38

For Team B a box-plot has been drawn.



- (a) On the graph above, draw a box-plot for Team A.

① Correct

2

① neat / ruler

- (b) Compare the shapes of the two distributions and discuss what statistical measures could be used to make a recommendation for the team to represent NSW.

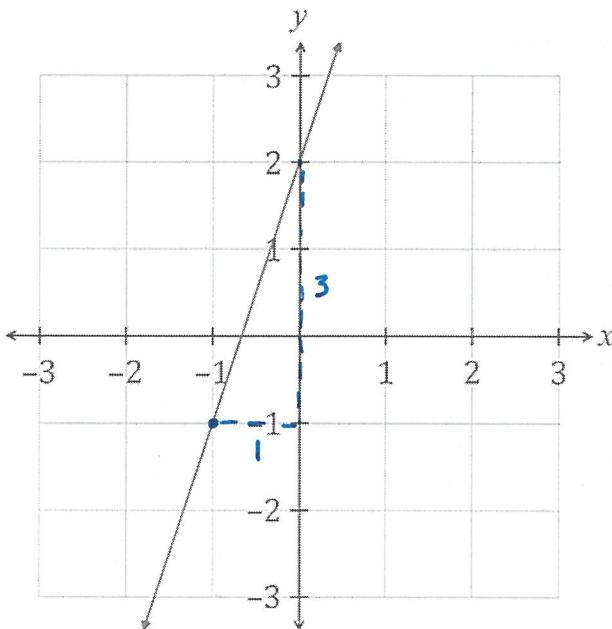
2

① Skew comparison
· Team A is positively skewed while team B is negatively skewed.
· The range of team A is larger than team B.
· The IQR of team B is larger than team A, this is a good measure to make a recommendation as it isn't affected by outliers.
· The median of team B is larger than team A which would also be a good measure for recommendation.

① 2 stat measures.

Question 27

Answer the following questions using the graph below.



- (a) What is the gradient of this straight line?

1

$$m = \underline{\underline{3}}$$

$$m = \underline{\underline{\frac{1}{3}}}$$

- (b) What is the y-intercept of this straight line?

1

$$b = \underline{\underline{2}}$$

- (c) What is the equation of this straight line?

1

$$y = \underline{\underline{3x + 2}}$$

- (d) What is the x-intercept of this straight line?

1

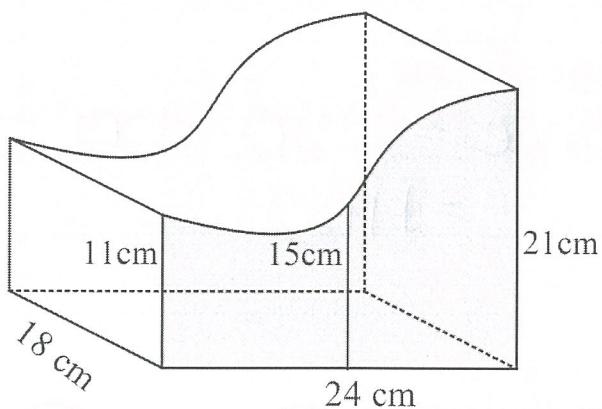
$$y = \underline{\underline{0}}$$

$$0 = \underline{\underline{3x + 2}}$$

$$x = \underline{\underline{-\frac{2}{3}}} \quad \text{accepted: } -0.6 + -0.7$$

Question 28

A container for sweets is in the shape of the irregular prism shown below.



- (a) Use two applications of the trapezoidal rule and the measurements below to approximate the area of the front face of the prism. 2

$$\text{Area} = \left[\frac{12}{2} (11 + 15) \right] + \left[\frac{12}{2} (15 + 21) \right] \quad \textcircled{1} \text{ application}$$
$$= 372 \text{ cm}^2$$

- (b) Calculate the volume of the prism. 1

$$V = 372 \times 18$$
$$= 6696 \text{ cm}^3$$

cfm if working shown

Question 29

Thomas bought a \$1250 tablet on hire-purchase plan, consisting of a deposit, then monthly payments. He paid a \$100 deposit and monthly instalments \$60 for two years.

- (a) Calculate the balance owing on the tablet.

$$\begin{aligned} \text{balance} &= 1250 - 100 \\ &= \$1150 \end{aligned}$$

1

- (b) What is the total amount paid for the tablet?

$$\begin{aligned} \text{Total paid} &= 100 + (60 \times 12 \times 2) \\ &= \$1540 \end{aligned}$$

2

- (c) Find the amount of interest paid for the tablet.

$$\begin{aligned} I &= 1540 - 1250 \\ &= \$290 \end{aligned}$$

1

- (d) What is the simple interest rate charged per annum? Give your answer to 2 decimal places.

$$\begin{aligned} I &= P r n \\ 290 &= 1150 \times r \times 2 \\ r &= \frac{290}{1150 \times 2} \times 100 \end{aligned}$$

2

$$r =$$

$$r = \text{, } \% \quad \text{①} \times 100 \text{ to give } \%.$$

End of Paper