Lego

Marking Section A

Term 2 Assessment Task 2018
Y11 Standard Mathematics

Time allowed: 50 minutes

Name: Solutions **Class:** _____

Miss Nicolaou Mrs Lego Miss Gamble/Mrs Hooper

Instructions:

- All questions should be attempted.
- Show ALL working on the exam paper in the space provided.
- Marks may not be awarded for careless or badly arranged work.
- Only board-approved calculators may be used.

Topics				TOTAL
Formulae and Equations	/19			/19
Data		/22		/22
Measurement and Energy			/16	/16
TOTAL	/19	/22	/16	/57

Section A: Formulae and Equations (19 marks)

For multiple choice questions, **circle** the correct answer.

	Questions	Marks
1)	The value of $\frac{x-2y}{5}$ when $x = -12$ and $y = 14$ is: A. 0 B. -0.52 C. -3.2 (D.) -8	1 D
2)	The solution to the equation $5x = 11 - x$ is: (A.) $x = \frac{11}{6}$ B. $x = \frac{6}{11}$ C. $x = \frac{11}{4}$ D. $x = \frac{4}{11}$	1 A
3)	Chelsea's attempt to solve an equation is shown. $2 + 3(x - 5) = 17$ $2 + 3x - 15 = 17$ *Line 1* $5x - 15 = 17$ *Line 2* $5x = 32$ *Line 3* $x = \frac{5}{32}$ *Line 4* Which lines do not follow correctly from the previous line in her solution? A. *Line 1 and Line 2* B. *Line 2 and Line 3* (C.) *Line 2 and Line 4* D. *Line 3 and Line 4*	1 C
4)	Solve the following equations: i) $6x - 3 = 27$ $6x = 30$ $x = 5$ (1) ii) $5(3x - 6) = 2(4x - 1)$ $15x - 30 = 8x - 2$ (1) $7x - 30 = -2$ $7x = 28$ $x = 4$ (1) iii) $\frac{3m}{4} = \frac{3}{4}$ (×5, ×5) $\frac{12m}{20} = \frac{15}{20}$ $12m = 15$ (1) $m = \frac{15}{12}$ $m = 1\frac{1}{4}$ (1)	1 2 2

v) $\frac{x}{3} + \frac{x}{2} = 5$ $\times 6$ $\times 6$

$\frac{6x}{3} + \frac{6x}{2} = 30$ ①

$2x + 3x = 30$

$5x = 30$

$x = 6$ ①

$\frac{2x}{6} + \frac{3x}{6} = 5$

$\frac{5x}{6} = 5$ ①

$5x = 30$

$x = 6$

2

5) The formula for calculating 'standard drinks' is given by: 2

$$S = V \times A \times 0.789$$

Where S is the number of standard drinks, V is the volume of drink in litres and A is the percentage of alcohol. $0.750\,L = V$

How many standard drinks are in a 750mL bottle of white wine with an 8% alcohol content? Write your answer correct to 1 decimal place.

A =

$S = 0.750 \times 8 \times 0.789$ ①

$S = 4.734$

① $S = 4.7$ standard drinks (to 1 dec pl)

∴ There are 4.7 standard drinks in the bottle

1 mistake. ①

$0.75 \times 8\% \times 0.789$

$= 0.04734$

$= 0.0$

6) The time taken in T seconds, for a pendulum of length L metres, to complete a single swing is given by:

$$T = \sqrt{\frac{L}{9.8}}$$

i) Write the formula with L as the subject. 2

$T^2 = \frac{L}{9.8}$ ①

$\therefore 9.8 \times T^2 = L$ } either line

$\therefore L = 9.8T^2$ } ①

ii) What is the length of the pendulum if it takes 4 seconds for a single swing? 2

when $T = 4$, $L = 9.8 \times 4^2$ ①

$L = 156.8\,m$ ①

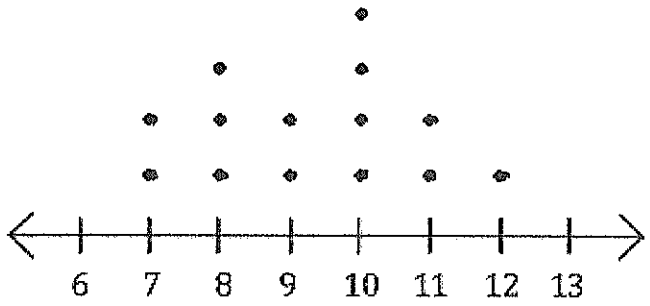
∴ Length of the pendulum is 156.8m

7)	The stopping distance of a car is given by: $$d = \frac{5Vt}{18} + \frac{V^2}{170}$$ where d is the stopping distance in metres, V is the velocity of the motor vehicle in km/h and t is the reaction time of the driver in seconds. Zac is driving his car through a school zone at a speed of 35km/h, when he notices a student run onto the road 13 metres in front of his car. If his reaction time is 0.50 seconds: i) How far will his car travel before he comes to a complete stop? Answer correct to 1 decimal place. $d = \frac{5 \times 35 \times 0.5}{18} + \frac{35^2}{170}$ (1) $d = \frac{87.5}{18} + \frac{1225}{170}$ $d = 12.06699346....m$ (1) $d = 12.1$m (to 1 dec pl) before he stops. ∴ Car will travel 12.1m before stopping. ii) Will he be able to stop in time before hitting the student? Give a reason for your answer. Yes he will stop. He needs 12.1m to stop and the student is further away with a gap of 0.9m	2 1

Section B: Classifying and Representing Data (22 marks)

For multiple choice questions, **circle** the correct answer.

	Questions	Marks
1)	In a Year 11 class, 3 girls and 3 boys were selected to have their homework checked. What is this type of sampling? A. Random (B.) Stratified C. Systematic D. Self-selected	1 B
2)	Mia records the colour of each car that travels through an intersection for an hour. The data recorded can be classified as: A. Continuous Numerical B. Discrete Numerical C. Ordinal Categorical (D.) Nominal Categorical	1 D

3)	A factory produces 2000 light globes each day. How often should a lightbulb be selected for a quality check, if a systematic sample of 25 lightbulbs is required each day? No of selections = 2000 ÷ 25 = 80 (1) ∴ Every 80th lightbulb should be selected.	1
4)	At Glenbrook High School, the attendance of all students is checked during Roll Call. Is data collected during this Roll Call called a sample or a census? Roll Call is a census as every/all students attendance is checked. (1)	1
5)	The dot plot shows the number of litres of water Jayden saves each day, over a two week period, by taking shorter showers.  Number of litres saved each day	
	i) Find the range of the data. Range = 12 − 7 = 5 (1)	1
	ii) How much does he save on average each day over the two weeks? Answer correct to 1 decimal place. $\bar{x} = \frac{2\times7 + 3\times8 + 2\times9 + 4\times10 + 2\times11 + 12}{14}$ (1) $= \frac{130}{14}$ = 9.285714286....L = 9.3 L (to 1 dec pl) (1) ∴ He saves 9.3L on average per day.	2

6) The stem-and-leaf plot represents the number of points per match scored by the Wests Tigers in a football season.

Stem	Leaf
2	3 5 5
3	0 2 □ 5
4	1 2 4 5 7 8
5	0 2 2 3
6	2 4 4

i) What possible points could West Tigers have scored in the match indicated by the □ ? Give one possible value. **1**

2, 3, 4 or 5 (1) - only one of these required.

ii) Calculate the median. **2**

median = $\frac{44+45}{2}$ (1)

$= 44\frac{1}{2}$ (1)

7) A survey was conducted of 11 054 households in the town of Goulburn. Each household was asked to indicate the number of cars registered to that household. The results of the survey are shown below:

Number of Cars	Frequency
0	988
1	4072
2	4608
3	1316
4	70
Total	11 054

(1) 11054 − 988 = ...

(1) (988×0) + (1×4072) + 4608 + 1316 + 70

i) What is the mode number of cars in a household? **1**

2 cars (1)

ii) A parking voucher was issued for each car registered to a household who completed the survey. How many parking vouchers were issued? **2**

Vouchers = 1×4072 + 2×4608 + 3×1316 + 4×70 (1)

= 17 516 vouchers (1)

iii) The results of the survey were presented in a sector graph. What is the angle in the sector representing the households with one car? Answer to the nearest degree. **2**

Sector ∠ = $\frac{4072}{11054} \times 360^\circ$ (1)

$= 132.6144382...^\circ$

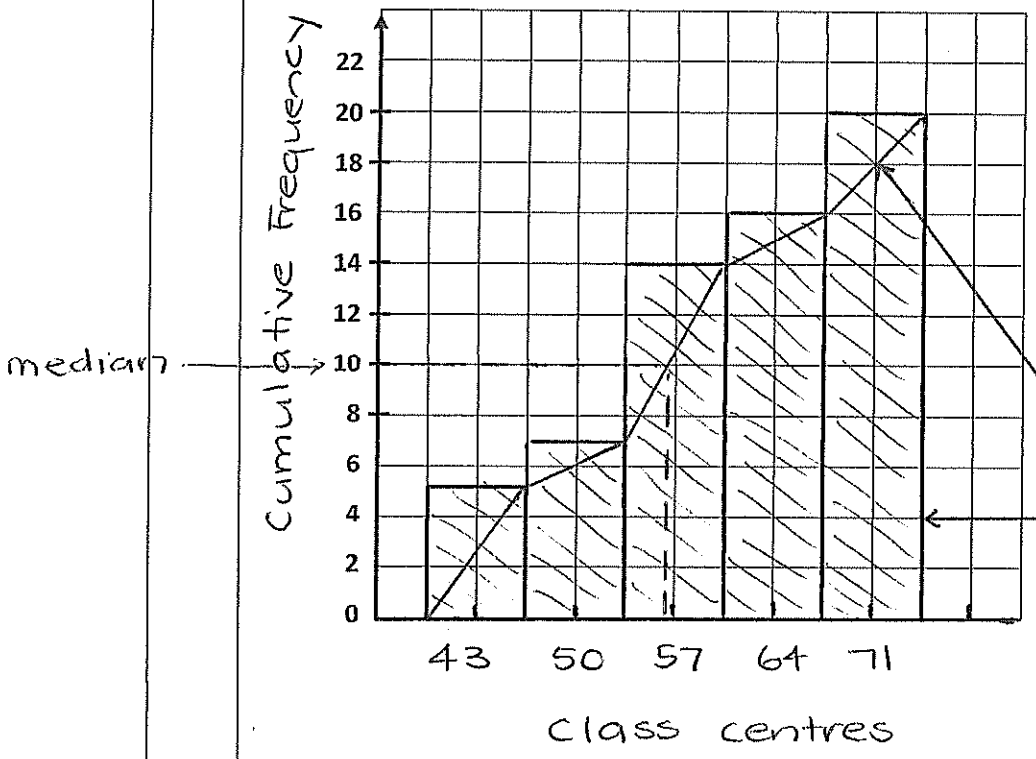
$= 133^\circ$ (to nearest deg) (1)

∴ sector angle of households with one car is 133°

8) i) Complete the frequency table for the grouped data. **2**

Class	Class Centre (cc) ①	Freq (f)	Cumulative Freq (cf) ①
40 – 46	43	5	5
47 – 53	50	2	7
54 – 60	57	7	14
61 – 67	64	2	16
68 – 74	71	4	20

ii) Construct a cumulative frequency histogram and ogive on the number plane provided. **3**



① – label both axes + correct class centres
① histogram
① ogive

iii) Find the modal class 54 – 60 ① **1**

iv) Using your graph, find the median 56 ① (from graph) **1**

Section C: Measurement and Energy (16 marks)

For multiple choice questions, **circle** the correct answer.

	Questions	Marks
1)	The distance between two cities is 2986 km. Rounded to 2 significant figures, this distance becomes: A. 29 km B. 2900 km C. 2986.00 km (D.) 3000 km	1 D
2)	A rectangular room is 6400 mm long and 3600 mm wide. What is the area of carpet required to completely cover the floor in the room? A. 23 040 000 cm^2 B. 23 040 cm^2 C. 23 040 m^2 (D.) 23.04 m^2	1 D
3)	The diameter of a human hair is 0.000 045 6 mm. In scientific notation this is equal to: A. 4.56×10^{-4} (B.) 4.56×10^{-5} C. 4.56×10^{4} D. 4.56×10^{5}	1 B
4)	The winning long jump at an international athletics event was 8 metres. i) What is the limit of reading? 1 metre (1) ii) What is the absolute error? $\pm$ 0.5 metres (1) iii) What is the percentage error in this measurement? % error = $\frac{\pm 0.5}{8} \times 100$ (1) $= \pm 6.25\ \%$ (1)	1 1 2
5)	Yiying uses a clothes dryer for 2 hours a day, 3 days a week, for 13 weeks during winter. If the clothes dryer has an energy rating of 1.5 kW per hour, and her electricity is charged at 23.6 cents per kWh, what is the cost of using the clothes dryer over winter? Answer correct to the nearest cent. Cost = $2 \times 3 \times 13 \times 1.5 \times \$0.236$ (1) $= \$27.612$ $= \$27.61$ (to nearest cent) (1)	2

6) An energy company's charges for gas over a 3 month period are shown in the table below:

Usage Charge	First 3500 MJ	$0.023 per MJ
	Additional MJ over 3500	$0. 016 per MJ

i) How much does it cost to use 3500 MJ? **1**

First 3500 MJ = 3500 × $0·023 (1)

= $80·50

ii) Ariel received a bill for $108.50. How much gas did she use in the billing period? **3**

Extra cost above 3500MJ = $108·50 − 80·50

= $28·00 (1)

Extra MJ = $28 ÷ 0·016

= 1750 MJ (1)

Total Gas = 1750 + 3500

(1) = 5250 MJ used in billing period.

7) The food label below is provided on a 540 g box of Weet Bix breakfast cereal.

NUTRITION INFORMATION (Average)

Serving Size: 30g (2 biscuits)

	PER SERVE	PER 100g
Energy (kJ)	447	1490
(Cal)	107	355
Protein (g)	3.7	12.4
Fat, Total (g)	0.4	1.3
- Saturated Fat (g)	0.1	0.3
- Trans Fat (g)	0.0	0.0
- Polyunsaturated Fat (g)	0.2	0.8
- Monounsaturated Fat (g)	0.1	0.2
Carbohydrate, Total (g)	20.1	67.0
- Sugars (g)	1.0	3.3
Dietary Fibre (g)	3.3	11.0
Sodium (mg)	81	270
Potassium (mg)	102	340

i) How many grams of fat are in the 540 g box? (1) **1**

Fat total = 1·3 × (540 ÷ 100) = 7·02 gms

ii) What is the energy value (kJ) of one biscuit? **1**

Energy = 447 ÷ 2 = 223·5 kJ (1)

iii) How many biscuits are in this box of Weet Bix? **1**

No. of bisc = (540 ÷ 30) × 2 = 36 (1) biscuits

End of Paper