

Name: Solutions

Class: 8MTH22_____

CHERRYBROOK TECHNOLOGY HIGH SCHOOL



YEAR 8 MATHEMATICS 2022 YEARLY EXAMINATION Measurement and Geometry

Time allowed – 30 minutes

**General
Instructions**

- Attempt all questions in the spaces provided
- Write your name on the question paper
- Write using black pen
- All necessary working should be shown
- Calculators approved by NESA may be used

Outcomes		Questions	Marks
MA4-12MG	Calculates the perimeters of plane shapes and the circumferences of circles	5	/4
MA4-13MG	Uses formulas to calculate the areas of quadrilaterals and circles, and converts between units of area	6, 7	/6
MA4-14MG	Uses formulas to calculate the volumes of prisms and cylinders, and converts between units of volume	8, 11	/6
MA4 -15MG	Performs calculations of time that involve mixed units, and interprets time zones	1, 2	/5
MA4-16MG	Applies Pythagoras' theorem to calculate side lengths in right-angled triangles, and solves related problems	9, 10	/5
MA4-17MG	Classifies, describes, and uses the properties of triangles and quadrilaterals	4	/5
MA4-18MG	Identifies and uses angle relationships, including those related to transversals on sets of parallel lines	3	/5
		TOTAL:	/36

Question 1 (3 marks)

Marks

not in exam

The following train timetable shows train departure times from Hornsby to Central station.

Monday to Friday						
Hornsby	08:51	09:00	09:04	09:16	09:22	09:31
Normanhurst	—	09:02	—	09:18	—	09:33
Thornleigh	—	09:05	—	09:21	—	09:36
Pennant Hills	—	09:07	—	09:23	—	09:38
Beecroft	—	09:10	—	09:26	—	09:41
Cheltenham	—	09:12	—	09:28	—	09:43
Epping	09:04	09:16	09:19	09:32	09:35	09:47
Eastwood	—	09:20	—	09:36	—	09:51
Denistone	—	09:23	—	09:39	—	09:54
West Ryde	—	09:25	—	09:41	—	09:56
Meadowbank	—	09:27	—	09:43	—	09:58
Rhodes	—	09:29	—	09:45	—	10:00
Concord West	—	09:32	—	09:48	—	10:03
North Strathfield	—	09:34	—	09:50	—	10:05
Strathfield	e09:15	09:39	e09:30	09:55	e09:46	10:10
Burwood	—	09:41	—	09:57	—	10:12
Redfern	—	09:51	e09:41	10:07	—	10:22
Central	i09:29	09:54	i09:44	10:10	i09:59	10:25

- (a) Jerry needs to arrive at Central station by 10.00 am. What is the latest time that he could board a train at **Pennant Hills** station? **1**

.....

- (b) How long does it take to travel from Hornsby to Central on the 8.51 am express train? **1**

.....

- (c) How much travelling time could be saved by taking the 8.51 am express train instead of the 9.00 am from Hornsby to Central? **1**

.....

Question 2 (2 marks)

not in exam but you should be able to do this

- Sarah was born on the 10th of October 2014. She wants to know how old she will be on the 16th of September 2025. Calculate her age on that day in years, months, and days. **2**

.....

.....

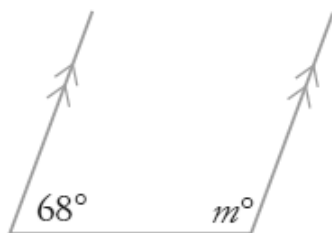
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Question 3 (5 marks)

Marks

- (a) Calculate the value of m . Give a reason for your answer

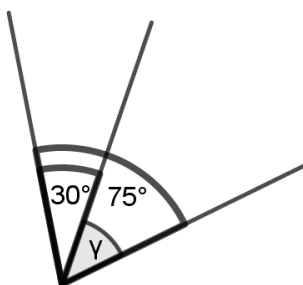
2



$$m = 180 - 68 \quad (\text{co-interior } \angle s) \\ = 112$$

- (b) Calculate the value of γ .

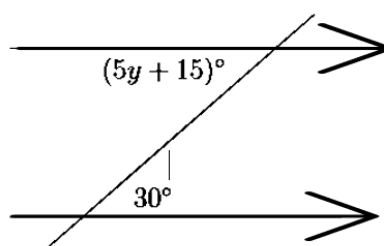
1



$$\gamma = 75 - 30 \\ = 45$$

- (c) Calculate the value of y .

2



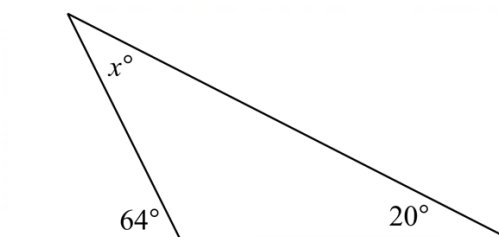
$$5y + 15 = 30 \quad (\text{alternate } \angle s) \\ 5y = 15 \\ y = 3$$

Question 4 (5 marks)

Marks

- (a) Calculate the value of x in the triangle.

1

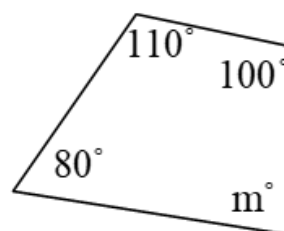


$$x + 20 = 64$$

$$x = 44$$

- (b) Calculate the value of m . Give a reason for your answer.

2

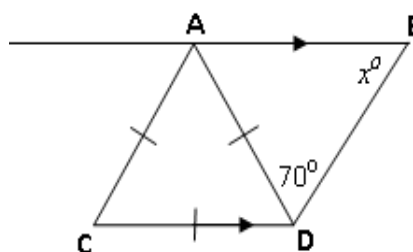


$$m + 280 = 360$$

$$m = 80$$

- (c) Calculate the value of the pronumeral, giving geometrical reasons.

2



$$\angle CDA = 60^\circ \text{ (equilateral } \Delta)$$

$$\angle DAB = 60^\circ \text{ (alternate } \angle s)$$

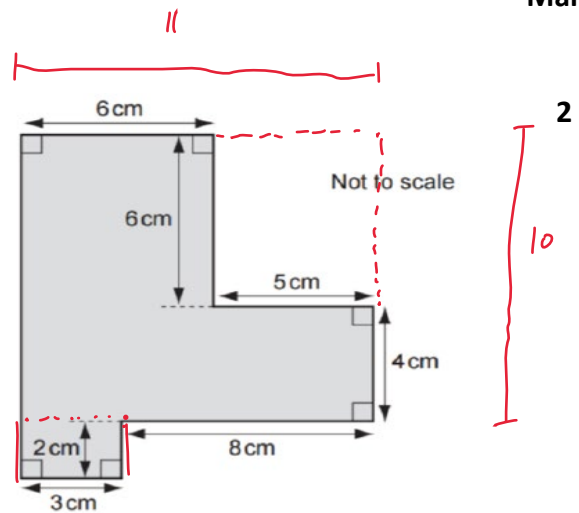
$$x + 130 = 180$$

$$x = 50$$

Question 5 (4 marks)

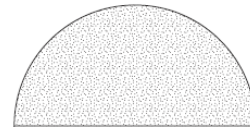
Marks

- (a) Calculate the perimeter of the composite shape.



$$\begin{aligned}
 P &= 2 \times (11 + 10) + 2 + 2 \\
 &= 2 \times 21 + 2 + 2 \\
 &= 42 + 4 \\
 &= 46 \text{ cm}
 \end{aligned}$$

- (b) The diameter of the semicircle is 10 cm. Calculate the perimeter of the semicircle correct to the nearest whole number.

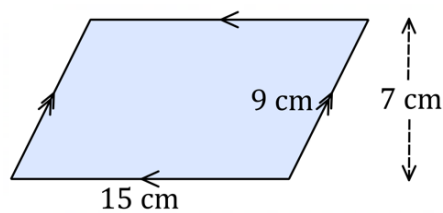


$$\begin{aligned}
 r &= 5 \text{ cm} \\
 P &= \frac{1}{2} \times 2\pi r + 2r \\
 &= \frac{1}{2} \times 10\pi + 2 \times 5 \\
 &= 5\pi + 10 \\
 &= 26 \text{ cm (nearest whole)}
 \end{aligned}$$

Question 6 (3 marks)

Marks

- (a) Calculate the area of the parallelogram.

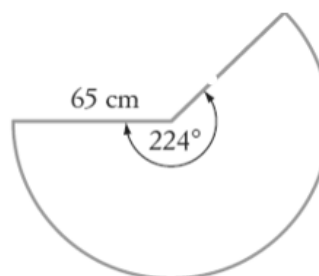


1

$$A = 15 \times 7$$

$$= 105 \text{ cm}^2$$

- (b) Calculate the area of the sector, correct to 2 d.p.



2

$$A = \frac{224}{360} \times \pi \times 65^2$$

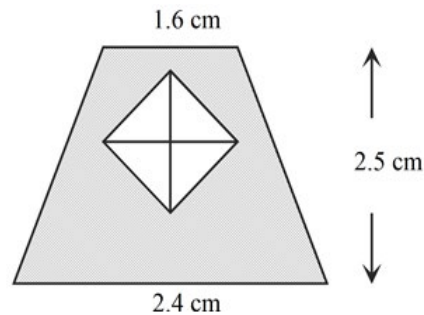
$$= 8258.90 \text{ cm}^2$$

Question 7 (3 marks)

Marks

Julie created an artwork in the shape of a trapezium with a square window cut into it as shown.

3



Each side of the square window measures 1.8 cm. The shaded area of the artwork is to be painted. Calculate the area that requires painting.

$$A(\text{trapezium}) = \frac{2.5}{2} (1.6 + 2.4)$$

$$= 1.25 \times 4$$

$$= 5 \text{ cm}^2$$

$$A(\text{square}) = 1.8 \times 1.8$$

$$= 3.24 \text{ cm}^2$$

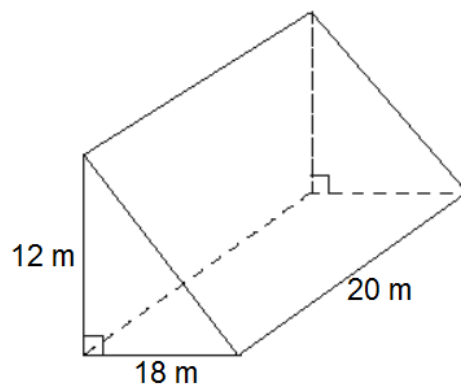
$$A = 5 - 3.24$$

$$= 1.76 \text{ cm}^2$$

Question 8 (1 mark)

Calculate the volume of the triangular prism.

1



$$V = Ah$$

$$= \left(\frac{1}{2} \times 18 \times 12 \right) \times 20$$

$$= 108 \times 20$$

$$= 2160 \text{ m}^3$$

Question 9 (2 marks)

Marks

Use Pythagoras' Theorem to decide if 7, 24 and 25 form a Pythagorean triad. Show all your working out.

2

$$7^2 + 24^2 = 49 + 576$$

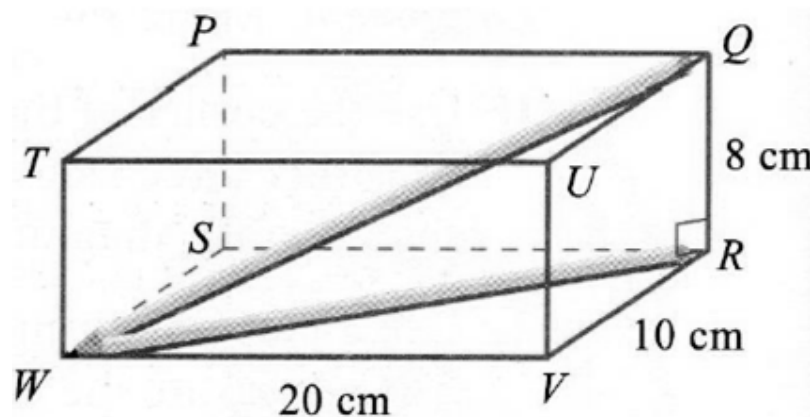
$$25^2 = 625$$

$$= 625$$

$\therefore 7, 24, 25$ form a Pythagorean triad

Question 10 (3 marks)

A wooden pencil case is in the shape of a rectangular prism with length 20cm, width 10cm and height 8cm.



Calculate the length of the longest pencil that will fit diagonally inside this pencil case (WQ). Give your answer correct to the nearest mm.

3

$$WQ^2 = 20^2 + 10^2$$

$$WQ^2 = 500 + 8^2$$

$$= 400 + 100$$

$$= 564$$

$$= 500$$

$$WQ = 23.7 \text{ cm (nearest mm)}$$

Question 11 (5 marks)

Marks

- (a) The can of baked beans pictured has a diameter of 11 cm and a height of 13 cm.

Calculate the volume of the can and write your answer in terms of π .



2

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

$$= \pi \times 5.5^2 \times 13$$

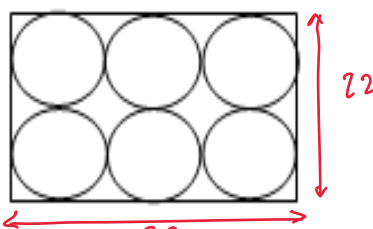
$$= 393.25 \pi \text{ cm}^3$$

- (b) 12 cans of baked beans are to be packed into boxes. There will be two rows of six cans, as shown in the diagrams below.

2



26



View of the open box from above

Calculate the volume in cm^3 of the smallest box that may be used to fit the 12 cans.

$$V = 33 \times 22 \times 26$$

$$= 18876 \text{ cm}^3$$

- (c) Convert your answer in part (b) to m^3 . Give your answer correct to 4 decimal places.

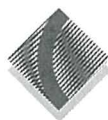
1

$$V = \frac{18876}{1000000} \text{ m}^3$$

$$= 0.0189 \text{ m}^3 \text{ (to 4 d.p.)}$$

Name: Solution
 Class: 8MTH22

CHERRYBROOK TECHNOLOGY HIGH SCHOOL



**YEAR 8 MATHEMATICS
 2022 YEARLY EXAMINATION**

Number and Algebra

Time allowed – 30 minutes

**General
 Instructions**

- Attempt all questions in the spaces provided
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Outcomes		Questions	Marks
MA4-4NA	Compares, orders and calculates with integers, applying a range of strategies to aid computation	1	/2
MA4-5NA	Operates with fractions, decimals and percentages	8, 11b	/6
MA4-6NA	Solves financial problems involving purchasing goods	10, 11a, 11c	/7
MA4-8NA	Generalises number properties to operate with algebraic expressions	3, 5	/6
MA4-9NA	Operates with positive-integer and zero indices of numerical bases	4	/2
MA4-10NA	Uses algebraic techniques to solve simple linear and quadratic equations	6, 7	/9
MA4-11NA	Creates and displays number patterns; graphs and analyses linear relationships; and performs transformations on the cartesian plane	2, 9	/6
		TOTAL:	/38

Question 1 (2 marks)

Marks

- (a) Peter receives \$50 from his grandparents for Christmas. During the school holidays he goes to the beach with his mates and spends \$2.60 on the bus fare and \$3.50 on an ice cream. For his birthday he receives \$25 from his uncle. 1

Write a directed number sentence to represent this situation

$$50 - 2.60 - 3.50 + 25 = 68.90$$

various other possibilities check each answer carefully.

- (b) Evaluate $\sqrt{\frac{194 - (-5)^2}{4}}$ 1

$$= \sqrt{\frac{194 - 25}{4}} = \underline{6.5}$$

or $\frac{13}{2}$

Question 2 (2 marks)

Mary generated the number pattern given in the table. 1

t	1	2	3	4
n	11	15	19	23

- (a) Find the rule linking the term (t) with each number (n).

$$t_n = 7 + 4n$$

- (b) Use your rule to find the 100th term in the number pattern. 1

$$t_{100} = 7 + 4 \times 100$$

$$= 407$$

Question 3 (2 marks)

Marks

Fully factorise $-8m - 24$

$$= 8(-m - 3)$$

$$-8(m + 3)$$

factorise with 2
lower factor
correctly give 1m }

Question 4 (2 marks)

Marks

- (a) Simplify, leaving your answer in index form.

1

$$5^2 \times 3^3 \times 5^4 \times 3^5 \times 6$$

$$5^6 \times 3^8 \times 6 = 5^6 \times 3^8 \times 2 \times 3$$

$$= 5^6 \times 3^9 \times 2$$

- (b) Explain why $3^2 \times 3^4 \neq 9^6$

1

$$3^2 \times 3^4 = 3^6 \text{ (according to index law)}$$

$\Rightarrow$ Multiplying bases leads to wrong answer.

$$\Rightarrow 3^2 = 3 \times 3 \quad 3^4 = 3 \times 3 \times 3 \times 3 \quad 3^2 \times 3^4 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$= 3^6$$

Question 5 (4 marks)

- (a) By substituting $p = 4$ and $r = 7$ calculate the value of $2p(r - 3)$.

2

$$= 2 \times 4 (7 - 3)$$

$$= 8 (7 - 3)$$

$$= 8 (4)$$

$$= 32$$

- (b) Expand $-3(x - 2y^3)$

2

$$-3x + 6y^3$$

Question 6 (1 mark)

Marks

Write an equation that has the solution $x = 5$.

(Any correct equation)
is right

1

$$5x = 25$$

$$x = \frac{25}{5} = 5$$

Question 7 (8 marks)

Solve each of the following equations, showing all of your working.

(a) $6x + 4 = 12$

2

$$6x + 4 = 12$$

$$6x = 12 - 4$$

$$6x = 8$$

$$x = \frac{8}{6} = \frac{4}{3}$$

(b) $\frac{x}{3} + 5 = 7$

2

$$\frac{x}{3} = 7 - 5$$

$$\frac{x}{3}$$

$$x = 2 \times 3$$

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

$$= 6$$

(c) $3t - 7 = t - 20$

2

$$3t - t = -20 + 7$$

$$2t = -13$$

$$t = \frac{-13}{2} = -6.5$$

(d) $x^2 = 144$

2

$$x = \pm\sqrt{144}$$

$$x = \pm 12$$

Question 8 (2 marks)What fraction is half-way between $\frac{8}{13}$ and $\frac{2}{3}$?

2

$$\frac{\frac{8}{13} + \frac{2}{3}}{2} = \frac{\frac{50}{39}}{2} = \frac{25}{39}$$

Question 9 (4 marks)

Marks

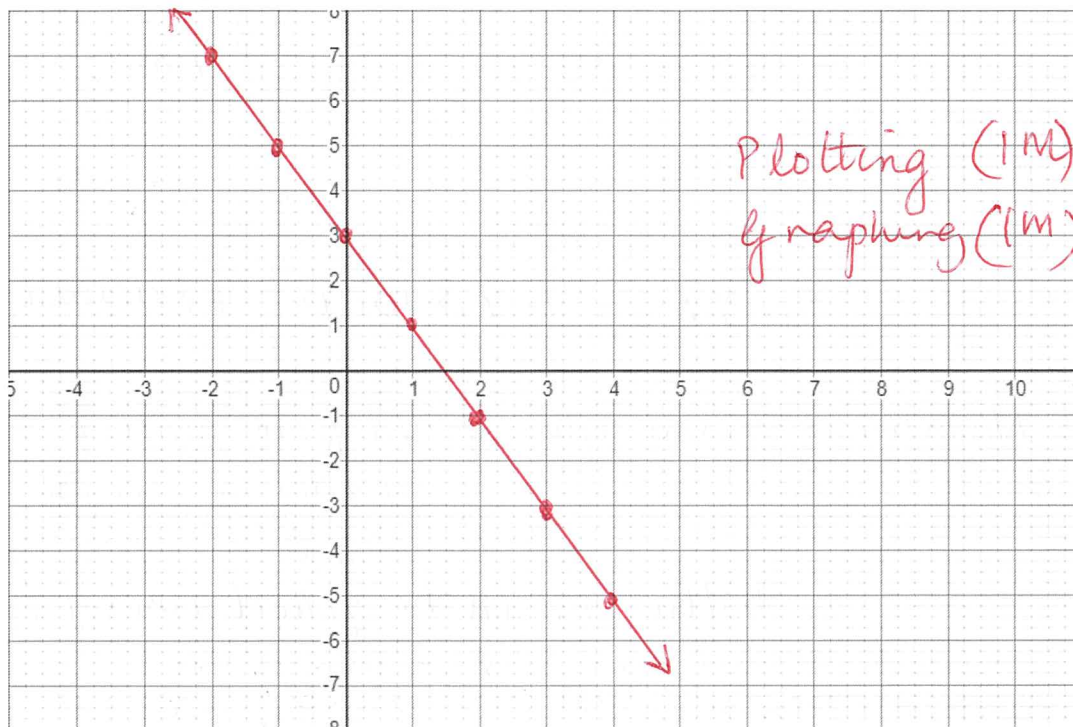
- (a) Complete the table of values for the equation $y = 3 - 2x$.

2

x	-2	-1	0	1	2	3	4
y	7	5	3	1	-1	-3	-5

- (b) Using your table of values, graph the equation of $y = 3 - 2x$ on the number plane.

2



Question 10 (3 marks)

Jane bought an apartment valued at \$220 000. In the first year her investment increased by 12%, in the second year the value dropped by 7%. Calculate the value of her property at the end of the second year?

3

$$\text{first year} \Rightarrow 220000 \times (100 + 12)\% = 246400$$

$$\text{second year} \Rightarrow 246400 \times (100 - 7)\% = 229152$$

$$\text{Value at the end of second year} = \$229152$$

5

Question 11 (8 marks)

- (a) A restaurant bill totals \$528, including the 10% GST. Calculate the actual price of the meal before the GST was added. 2

$$\text{original} \times 110\% = 528$$

$$\text{Original} = \frac{528}{110\%}$$

$$= \$480$$

- (b) A bottle contains 1.7 litres of milk.

- (i) How many 250ml glasses can be filled from the bottle? 2

$$1.7 \text{ L} = 1.7 \times 1000 = 1700 \text{ ml}$$

$$\begin{aligned} \# \text{ Number of 250ml glass filled from bottle} \\ = \frac{1700}{250} = 6.8 \end{aligned}$$

$\therefore$ 6 bottles could be filled using 1.7L

- (ii) There will be some milk left over. If this is poured into a glass, what percentage of the glass will be filled? 2

200 ml is left

$$\therefore \frac{200}{250} = \frac{4}{5} \text{ of the glass will be filled}$$

$$\Rightarrow \frac{4}{5} \times 100 = 80\% \text{ of the glass will be filled.}$$

- (c) Bramley apples cost \$4.60 for a 3kg bag at Woolworths. The same type of apples cost \$11.40 for a 7.5kg bag at Coles. Which of the two supermarkets gives the better value for money? Remember to show your working. 2

$$\text{dollars per kg at Woolworth} = \frac{4.60}{3} = \$1.53/\text{kg}$$

$$\text{dollars per kg at Coles} = \frac{11.40}{7.5} = \$1.52/\text{kg}$$

coles gives better value.

END OF PAPER

Name: _____

Class: 8MTH22_____

CHERRYBROOK TECHNOLOGY HIGH SCHOOL



YEAR 8 MATHEMATICS 2022 YEARLY EXAMINATION Statistics and Probability

Time allowed – 30 minutes

**General
Instructions**

- Attempt all questions in the spaces provided
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Outcomes		Questions	Marks
MA4-19SP	Collects, represents, and interprets single sets of data, using appropriate statistical displays	1, 2ab, 3a, 5a, 6	/10
MA4-20SP	Analyses single sets of data using measures of location, and range	2c, 3b, 5b, 7, 9	/8
MA4- 21SP	Represents probabilities of simple and compound events	4, 8, 10, 11	/16
		TOTAL:	/34

Question 1 (3 marks)

Marks

Classify the following types of data.

- (a) Weights of Year 8 students **2**

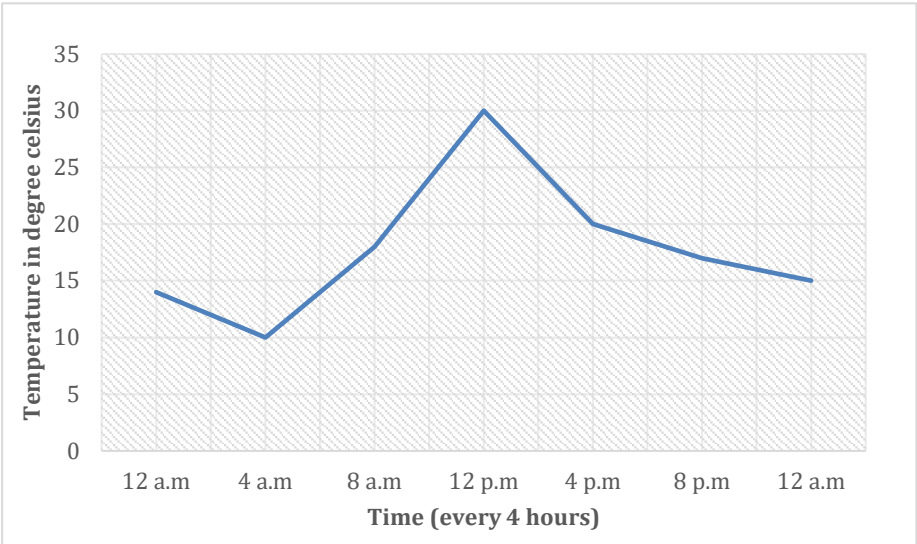
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- (b) Brands of coffee **1**

.....

Question 2 (4 marks)

The temperature in Broken Hill was recorded every four hours over a 24-hour period and then displayed on the line graph. Use the graph to answer the following questions.



- (a) What was the temperature at 12 pm? **1**

.....

- (b) What was the lowest temperature and at what time did it occur? **2**

.....

.....

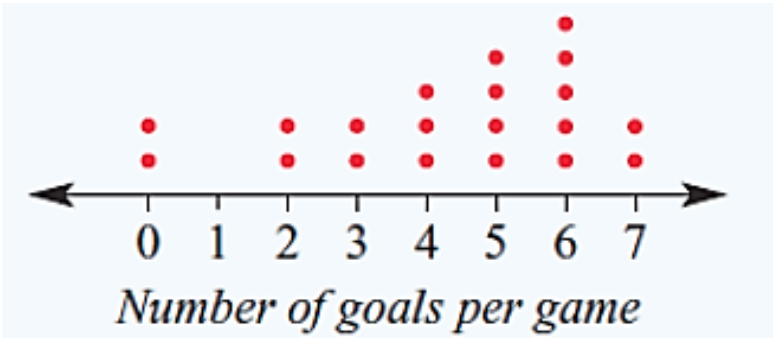
- (c) What was the temperature range over the 12 hours? **1**

.....

Question 3 (2 marks)

Marks

This dot plot shows the number of goals scored per game by a team during the last soccer season.



- (a) How many games were played? 1

.....

.....

- (b) Calculate the mean number of goals scored. 1

.....

.....

.....

.....

Question 4 (2 marks)

An ordinary die is rolled once.



- (a) List the sample space 1

.....

- (b) What event is the complement of getting a 2 or a 3? 1

.....

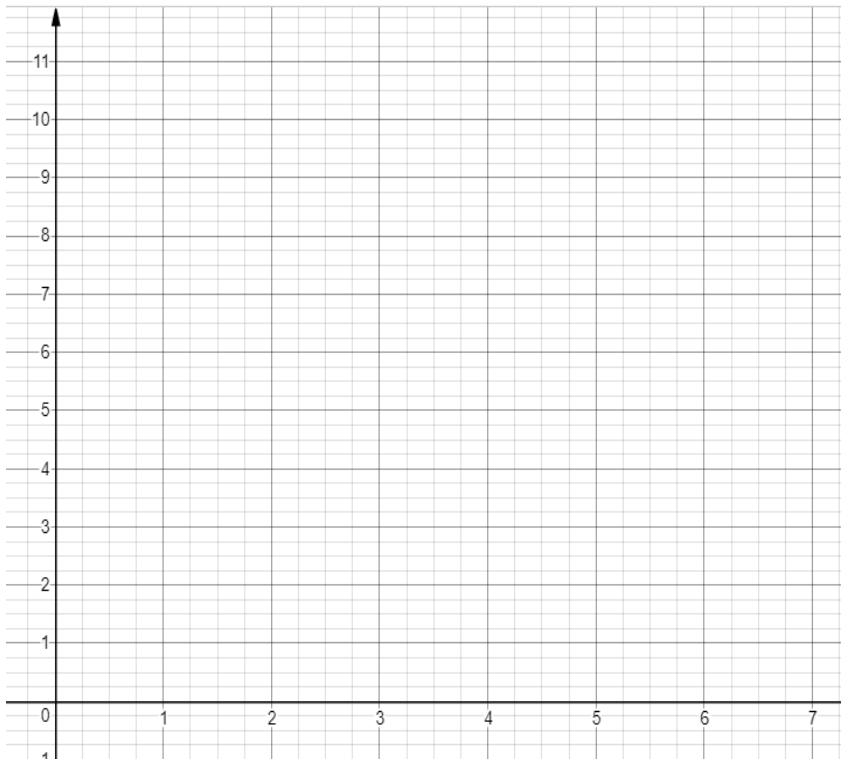
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The frequency table below shows the number of cars owned by each household along a section of Purchase Road.

Score (x)	Frequency (f)
1	4
2	9
3	6
4	7
5	3
6	1

(a) Label the axes and draw a frequency histogram.

2



(b) Calculate the mean number of cars owned by households in this stretch of Purchase Road.

1

.....

.....

.....

Question 6 (1 mark)

Marks

Which data collection method is the most appropriate for finding out the most popular food sold in NSW public schools?

1

Question 7 (4 marks)

In 13 cricket innings Shane scored the following runs.

58, 53, 39, 75, 61, 71, 47, 64, 0, 69, 53, 27, 56

(a) Find the median number of runs.

1

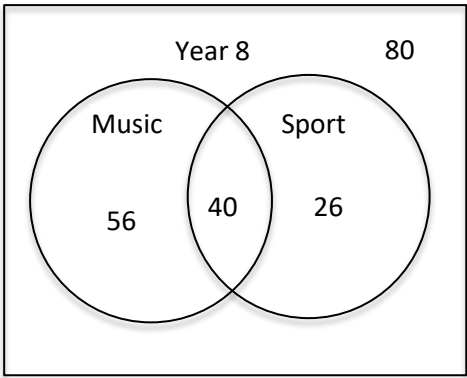
(b) State the “outlier” in this question, and briefly describe how it affects the mean, the median and the modal scores.

2

(c) Which measure of location is the better reflection of Shane’s batting average? Give a reason for your answer.

1

The Venn diagram shows students from Year 8 at CTHS who represent the school in sport or music.



- (a) How many students are there in Year 8? 1

.....

.....

- (b) A student is chosen at random.

- (i) What is the probability that the student represents CTHS in sport? 1

.....

.....

- (ii) What is the probability that the student represented CTHS in sport or music but not **both**? 1

.....

.....

- (c) How many Year 8 students did not represent CTHS in sport **or** music? 1

.....

.....

Question 9 (1 mark)

Marks

Below is a ‘stem and leaf’ plot of marks obtained in a Maths exam by a class of 30 students.

Stem	Leaf								
5	7	8	9						
6	0	1	1	2	3	7	7	8	9
7	2	4	5	5	6	8	8		
8	0	0	0	2	3	7			
9	1	1	x	3	3				

If the modal mark is 80, what is the value of x ? 1

Question 10 (3 marks)

One card is drawn at random from a standard deck of playing cards



(a) What is the probability that the card is a 2 of hearts? 1

(b) What is the probability that the card is a queen? 1

(c) What is the probability of getting a queen or a 2 of hearts? 1

A sample of adults living in Cherrybrook was surveyed on their possession of a driver’s licence and car ownership. The information is summarised in the two-way table.

	Has driver’s licence	Does not have driver’s licence	Total
Owens a car	75		80
Does not own a car		12	
Total	123		140

(a) Complete the four missing numbers in the two-way table. 3

(b) An adult from Cherrybrook is chosen.

(i) What is the probability that the adult owns a car **and** has a licence? 1

.....

.....

(ii) What is the probability that the adult owns a car **or** has a licence **or** both? 1

.....

.....

.....

(c) Complete the Venn diagram using the information from the two-way table. 2

