Name: _____

Year 9 Stage 5.2 Mathematics
Assignment Term 3 2023

Equations, Geometrical Figures, Congruence and Similarity, & Indices		
Task number: 3	**Weighting: 15%**	**Due Date: 30/08/2023**

Nature and description of the task:

Today you are receiving a "Preparation Booklet" with a series of problems. You are expected to investigate/attempt each of these questions and submit the solutions on the due date. On the 30th August 2023 you will receive a selection of questions similar to those in this preparation activity booklet. You will have 20 minutes to complete an in-class Validation Task.

The final mark for this assessment is broken down as follows:

- Take-home Preparation Booklet = 70%
- In-class Validation Task = 30%

NOTE:

- You will **NOT** have access to the Preparation Booklet during the in-class Validation Task.
- Marks may be deducted for a lack of working out. Please show all working out for all short answer questions.

Outcomes assessed:

MA5.2-1WM selects appropriate notations and conventions to communicate mathematical ideas and solutions

MA5.2-2WM interprets mathematical or real-life situations, systematically applying appropriate strategies to solve problems

MA5.2-3WM constructs arguments to prove and justify results.

MA5.1-11MG describes and applies the properties of similar figures and scale drawings

MA5.2-14MG calculates the angle sum of any polygon and uses minimum conditions to prove triangles are congruent or similar

MA5.2-7NA applies index laws to operate with algebraic expressions involving integer indices

MA5.2-8NA solves linear and simple quadratic equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques.

Non-Completion of Task:

If you know you are going to be away on the day of the Validation Task, you must make alternative arrangements with your teacher beforehand. If you are suddenly away on the day of the Task, you must contact your teacher on your return to school. Documentation will be required in both cases.Plagiarism, the using of the work of others without acknowledgement, will incur serious penalties and may result in a zero award. Any cheating will also incur penalties.

Failure to follow the above procedures may also result in a zero award. The policies and procedures that are outlined on the ROSA booklet will be followed regarding the non-completion of assessment tasks.

Marks:

OUTCOME	MARK
Equations • MA5.2-8NA solves linear and simple quadratic equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques.	**/21**
Properties of Geometrical Figures • MA5.2-14MG calculates the angle sum of any polygon and uses minimum conditions to prove triangles are congruent or similar	**/21**
Indices • MA5.2-7NA applies index laws to operate with algebraic expressions involving integer indices	**/18**
TOTAL	**/60**

Section 1 Equations (21 Marks)

1 Solve, showing all working: **8**

(a) $2y + 5 = 15$

(b) $\frac{2x}{4} = 6$

(c) $\frac{2m}{6} - 2 = 5$

(d) $5m + 4 = 2m - 5$

2 Given the formula $v = u + at$ find u when v = 135, a = 20 and t = 5 **2**

3 Solve the quadratic equations, showing all possible solutions: **3**

(a) $w^2 = 4$

(b) $x^2 + 11 = 36$

5 Write an equation, and then solve it, to answer the problem: **3**

"three consecutive numbers whose sum is 384"

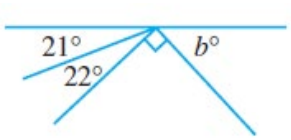
6 Graph $x > 4$ on a number line. **1**

7 Graph $3 \leq x < 5$ on a number line. **2**

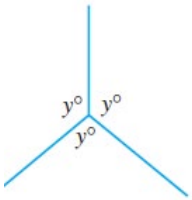
8 Solve for x: $3(x - 1) > 7$ **2**

Section 2: Geometrical Figures, Congruence and Similarity (21 Marks)

1 Find the value of the pronumerals in each of the following:

(a) 

1

(b) 

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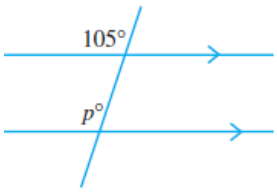
(c) 

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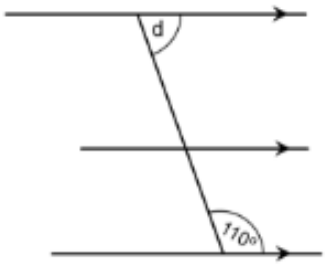
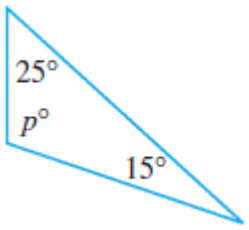
(d) 

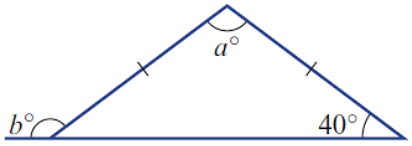
1

2 Find the value of the pronumerals, giving reasons for your answers.

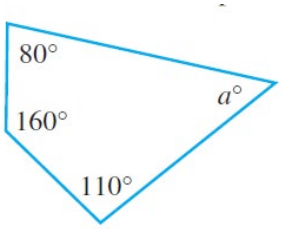
(a) 

1

(b) **2**



(c) **1**

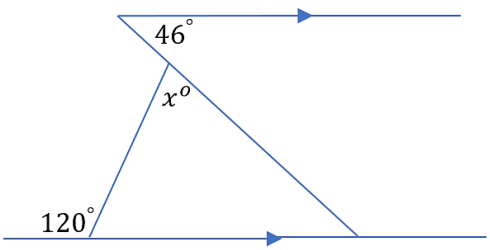


3 Using the angle sum of a polygon formula:

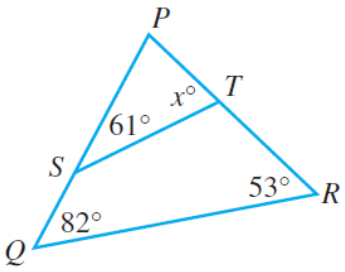
(a) Calculate the angle sum of a regular octagon. **1**

(b) Calculate the size of each individual interior angle in a regular octagon. **1**

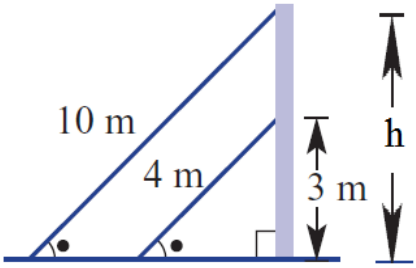
4 Find the value of the pronumeral x **2**



5 What is the value of x in the diagram below? **2**



6 In the diagram below, angles that are marked the same are equal angles. The two cables are 4m and 10m in length while the shorter cable reaches 3 m up the pole.

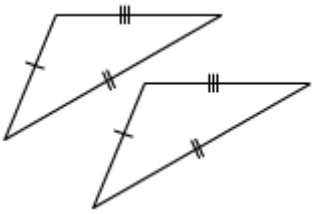


Find the height (*h*) of the pole, showing all working.

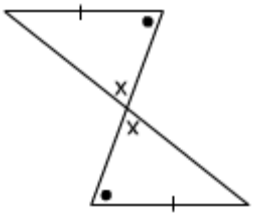
HINT: It may be easier to visualise the two triangles drawn apart and match up the matching angles and the matching sides. **2**

7 Which of the four congruence tests (AAS, SSS, SAS, RHS) would be used to show these pairs of triangles are congruent? **2**

(a)



(b)



8 Why is AAA not a valid test for congruency in triangles? **1**

9 The distance from Sydney to Melbourne by air is 710km. What would this distance be on a map if the map has a scale of 1:10 000 000? Express your answer in centimetres. **2**

Section 3: Indices (18 Marks)

1 Simplify the following, leaving your answer in index form **2**

(a) $x \times x \times y \times y \times y =$

(b) $\frac{m \times m \times m}{d \times d} =$

2 Simplify the following: **3**

(a) $3w^2 \times 12w^2y^3 =$

(b) $(m^6)^8 =$

(c) $\frac{24m^3k^6}{36m^4} =$

3 How many significant figures are there in the number 435 000? **1**

4 Write as a basic numeral: **2**

(a) $2.31 \times 10^4 =$

(b) $1.035 \times 10^{-3} =$

5 Fill in the blanks to make the equations equivalent? **2**

$(\square x^3)^2 = 25x^{\square}$

6 Consider the equation $ax^2 = (ax)^2$ **2**
Is this true for *all* values of a? Give a reason for your answer, showing examples.

7 Use your calculator to evaluate the following, correct to 3 significant figures: **2**

(a) $(1.94)^2 + 3.7 \times 2.5 \times 1.48 =$

(b) $\sqrt{\frac{1}{0.07 \times 0.085}} =$

8 State True or False for the following: **3**

(a) $5m^0 - 4m^0 = 1$

(b) $d^0 \div d^0 = 0$

(c) $\frac{5^0}{0} = 0$

9 The area of Australia is approximately $7.7 \times 10^{12}\ m^2$. If the population of Australia in 2026 is expected to be 27 million people, how much land will there be for each person? Give your answer to the nearest m^2. **1**