



Chester Hill High School

Strength in Unity, Excellence in Education

Assessment Task

Course:	Mathematics	Year:	12
Topics:	Measurement		
Assessment Name:	Rates and Ratios		
DATE DUE:	Term 2, Week 8, Monday 17/6/19, Beginning of Period 2	Total Mark	
STUDENT NAME:			
Progress Check FEEDBACK	<input type="checkbox"/> Completed the teenage retreat floor plan (1 mark) <input type="checkbox"/> Completed the TV running cost table (1 mark) <input type="checkbox"/> Screenshots of TV energy consumption evidence (1 mark)		
Progress Check Date:	Term 2, Week 6, Wednesday 5/6/19, Beginning of Period 1	Marks	

I certify that

- This assignment is my own work, based on my personal study and/or research.
- I have **acknowledged all material and sources used in the preparation** of this assignment in a **reference list**.
- Submitted assignments based on group work are not the same as other students' work.
- I have not plagiarised (copied) in part, or in whole the work of other students.
- I have read and I understand the success criteria used for this assessment
- **I have kept a copy of my assignment and the receipt.**
- I understand that a copy of my assignment may be kept and used to make comparisons with other assignments in the future.

Student's Signature: Date:

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Assessment Task Student Receipt

(This receipt should be kept as proof of assessment submission)

FAMILY NAME:	GIVEN NAME:
TEACHER:	CLASS:
DATE DUE:	DATE SUBMITTED:
TITLE OF TASK:	TEACHER'S SIGNATURE:

Task Information

Important idea(s) being explored:	Using rates and ratios to solve problems in practical contexts, including the interpretation of scale drawings.
Task Requirements:	Students are required to: <ul style="list-style-type: none">➤ design and draw a scale drawing of a floor plan for a teenage retreat➤ determine the costs involved in running electrical appliances within the retreat➤ determine the cost of supplying and running hot water for the retreat➤ determine the size of the water tank needed for the retreat➤ show working out where necessary➤ complete “Feedback from student about task”
Syllabus Outcomes:	<ul style="list-style-type: none">➤ MS2-12-3 interprets the results of measurements and calculations and makes judgements about reasonableness, including the degree of accuracy and the conversion of units where appropriate➤ MS2-12-4 analyses two-dimensional and three-dimensional models to solve practical problems➤ MS2-12-9 chooses and uses appropriate technology effectively in a range of contexts, and applies critical thinking to recognise appropriate times and methods for such use➤ MS2-12-10 uses mathematical argument and reasoning to evaluate conclusions, communicating a position clearly to others and justifying a response

Feedback from student about task:

I spent _____ hours working on this task.

The hardest part of this task was _____

The easiest was _____

What I have enjoyed most about learning in *Mathematics* is _____

Learning in *Mathematics* could be improved if:

Dear teacher, I need help in the following areas:

Success Criteria

Outcome	A	B	C	D	E
Part 1: Teenage retreat floor plan		Designs and draws a retreat that meets at least nine of the ten criteria and is to scale.	Designs and draws a retreat that meets half of the given criteria	Designs and draws a retreat that meets two to three of the given criteria.	Designs and draws a retreat that meets zero to one of the given criteria.
Part 2:		Determines the running cost for the retreat for a year Q4.	Determines which product to use and provides reasoning Q3.	Calculates the running cost correctly Q2.	Completes the table with one or two appropriate choices and/or prices Q1.
Part 3: Question 1-3	All working is shown. Rainfall for each month is taken into account. Takes into consideration usage. Provides sophisticated reasoning.	Most working is shown. Rainfall for each month is taken into account. Determines the volume of water and capacity of the tank required.	Some working is shown. Rainfall is taken into account.	Correctly answers simple question Q1. Little working is shown to justify answer.	Not completed.

FEEDBACK from Teacher:

Work is neat and well-presented.

Completion of assessment during allocated class time. Excellent Moderate Limited

Teacher Signature		Mark	
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Year 12 Standard 2 Assessment Task

Part 1 (11 marks)

In Part 1, you will design and draw a scale drawing of a floor plan for a teenage retreat in Wollongong. It must use the recognised symbols and abbreviations on building plans.

Common floor plan symbols



Door swing – indicates direction the door opens



Shower – shower without a bathtub



Window – glass window in a solid wall



Toilet – toilet located on wall



Kitchen sink – two-compartment kitchen sink



Bathtub – bathtub showing location of drain

The retreat must have the following attributes:

- Scale of 1:25cm (1 mark)
- Dimensions of 4m x 6m (1 mark)
- Identified sleeping area (1 mark)
- Built-in wardrobe/cupboard (1 mark)
- A bathroom with an entry, toilet, shower and hand basin (3 marks)
- Identified living/study area (1 mark)
- Door into the retreat (1 mark)
- 1:4 window to wall ratio (1 mark)
- Items are to scale (1 mark)

Draw your plan using the grid paper provided on the following page

Part 2 (18 marks)

In Part 2, you will calculate the costs involved in running electrical appliances within the retreat. The cost of supplying and running hot water will also be determined.

Question 1

Appliances can be compared in terms of their running costs for different numbers of years based on energy consumption. Go to the Harvey Norman website and select **two** items for each of the following appliances: TV, fridge and reverse-cycle air conditioners. Visit the website <http://www.energyrating.gov.au/calculator> to 'Compare Products'. Select an appliance and compare the cost of 2 different types of each appliance, comparing the cost over 1 year and 10 years. Record your results below. (6 marks)

TV	Model 1	Model 2
Brand/Name of product (from Harvey Norman)		
Purchase price (from Harvey Norman)		
Energy used each year		
Annual running cost		
10 year running cost + Purchase price		
Total cost of ownership		

Take a screenshot of each model's running cost table to print out and attach all print outs to the back of your assignment.

Fridge	Model 1	Model 2
Brand/Name of product		
Purchase price		
Energy used each year		
Annual running cost		
10 year running cost + Purchase price		

Total cost of ownership		
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Take a screenshot of each model to print out and attach all print outs to the back of your assignment.

Enter the postcode for Wollongong (2500) and compare the models provided:

Reverse cycle air-conditioner	Model 1	Model 2
Brand/Name of product		
Purchase price		
Months/year used for heating and cooling	4 months	4 months
Hours/day used for heating and cooling	6 hours	6 hours
Energy used each year		
Annual running cost		
10 year running cost + Purchase price		
Total cost of ownership		

Take a screenshot of each model to print out and attach all print outs to the back of your assignment.

Question 2

Use the website <https://www.bunnings.com.au/> to research **one** of each type of suitable water heater for the size of your retreat. Calculate the cost of running per year charged at a rate of 28.7c/kWh. Assume that same day installation costs **\$349**.

- a) What size water heater is needed for the retreat if one person is using it? (1 mark)

- b) i) Determine the initial cost of running an **electric** water heater with a tank (1 mark)

Take a screenshot of your selected electric water heater and attach all print outs to the back of your assignment.

ii) Determine the running costs of running an electric water heater with a tank in cents per year. Assume it is running for 6hrs/day every day in the year (1 mark)

c) i) Determine the initial cost of running a **solar** water heater (1 mark)

ii) Determine the running cost of running a **solar** water heater in cents per year. Assume it is running for 6hrs/day every day in the year (1 mark)

Take a screenshot of your selected solar water heater and attach all print outs to the back of your assignment.

Question 3

For each item, indicate which product you would use and justify your answer for each. (3 marks)

Question 4

Determine the running cost for the retreat **for a year**. Show all working. (2 marks)

Part 3 (6 marks)

In part 3, students will determine the size of the water tank they will need to attach to the retreat.

1. Given the average monthly rainfall in Wollongong is 191mm, determine the average yearly rainfall. (1 mark)

2. You are interested in purchasing a water tank to capture the rainfall that falls on the roof of your teenage retreat throughout the entire year. Assume that the roof of your retreat (24m²) will catch 90% of the water that falls on it. Determine the volume of water hence, the capacity of the tank required. (3 marks)

3. The retreat is occupied by one person for 150 days per year and the average water usage per person per day is 340L. Determine whether or not the retreat would capture sufficient rain water for its usage. Justify your answer. (2 marks)
