THE RIVERS SECONDARY COLLEGE
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Assessment Task Notification

RICHMOND RIVER HIGH CAMPUS

Task Number	1	**Task Name**	Investments and loans investigation
Course	Mathematics Standard 2	**Faculty**	Mathematics
Teacher	Ms Humphrys, Mrs Tyson	**Head Teacher**	Ms Humphrys
Issue date	Thursday 7/11	**Due date**	Monday 9/12
Focus (Topic)	Investments and loans	**Task Weighting**	30%

Outcomes

MS2-12-5 makes informed decisions about financial situations, including annuities and loan repayments
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

Task description

The assignment is an investigation on the best buy for a car and getting a loan. Using the attached links and your own research justify which car would be the best buy in terms of its cost, loan repayments, depreciation, and fuel costs.

Students will be expected to complete the task at home during their own time.

This task can be submitted on paper or electronically and is available on the Google Classroom (code: q56qc4x)

Marking Guidelines

Questions will have varying mark values. The mark value for each question is shown with the question.

Q1 **Selecting cars to compare**

Research and select one car with each engine make (Petrol, Hybrid, Electric). Each car that you select must be of a similar size to allow for accurate comparisons (SUV, Sedan, etc.). For each car, fill out the information in the table.

Car Type	Petrol	Electric	Hybrid
Model (e.g. Mazda)			
Make (e.g. CX3)			
Cost ($AUD)			

(2 Marks)

1 Mark for all cars in similar size

1 Mark for table filled in

Q2 **Getting a loan**

a) **Now that you have selected your three cars to compare, it is time to get a loan. Using your research, find the best loan for 5 years and justify why it would be the best. For your loan fill out the following: (include a screenshot of your information)**
   - **Financial Institution**
   - **Loan Type**
   - **Interest rate p.a.**

(4 Marks)

1 mark for loan

1 mark for screenshot

2 marks for justification

b) **Now that you have selected your loan, use the websites calculator to find the following for each vehicle and attach a screenshot:**

Car Type	Petrol	Electric	Hybrid
Weekly Repayments			
Estimated interest paid on the loan			
Total estimated cost of the loan			

(2 Marks)

1 Mark for completed table

1 mark for correct calculations

Q3 **Depreciation**

a) Using the attached online calculator, fill out the following information on each vehicle's depreciation. Attach a screenshot of the graph for each vehicle:
https://caredge.com/depreciation

(6 Marks)

2 marks for each table filled out correctly from the website with a screenshot of the graph attached

i) Petrol: _____

Number of years (n)	1	2	3	4	5
Salvage value (S)					

ii) Electric: _____

Number of years (n)	1	2	3	4	5
Salvage value (S)					

iii) Hybrid: _____

Number of years (n)	1	2	3	4	5
Salvage value (S)					

b) Use the declining-balance method to calculate the five-year average rate (r) each car depreciates per annum. Hint, use the salvage value after the fifth year in the formula $S = V_0 (1 - r)^n$.

- S is the salvage value of the asset after n periods
- V_0 is the initial value of the asset
- r is the depreciation rate per period, expressed as a decimal
- n is the number of periods

(6 marks)

1 mark for each formula substituted with correct values

1 mark for each correct interest rate calculated

i) Petrol: _____

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

ii) Electric: _____

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

iii) Hybrid: _____

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

Q4 **Fuel Costs** **(4 marks)**

Now you are now going to determine the fuel usage and cost for each of your three vehicles:

a) Determine the Urban, Extra Urban and combined fuel consumption (L/100km) and entering the details of your three cars (you could use Green Vehicle Guide or another similar website). Include a screenshot from the website.

1 mark for petrol car filled out correctly

1 mark for electric car filled out correctly

1 mark for hybrid car filled out correctly

1 mark for the screenshot

Car Type	Petrol	Electric	Hybrid
Urban	_____ L/100km	_____ kWh/100km	_____ L/100km
Extra Urban	_____ L/100km	_____ kWh/100km	_____ L/100km
Combined	_____ L/100km	_____ kWh/100km	_____ L/100km

b) Define each type of fuel consumption. (urban, extra urban and combined)

(3 marks)
1 mark for each definition

c) Which category of fuel consumption will you fall under? In your response, justify why your car usage falls into that bracket.

(3 marks)

1 mark for justification for each car

d) On average Australians drive 13,301km per year. Calculate on average how many kilometres you might drive in a year. Provide a justification for the distance you travel in a year (e.g., living out of town). Do not forget to factor in any trips you may do to the beach or to visit distant friends/family.

Km/Year: _____

(3 marks)

1 mark for km/ year

2 marks for justification on distance travelled

	e) Now that you know how many kilometres on average you will travel in a year, calculate the annual cost of fuel/electricity. Use the following websites to look at the 12-month average cost of fuel/electricity. (Show working) - **NSW Trends** - **Drive.com.au** **Petrol: $ _____** **Electric: $_____** **Hybrid: $_____**	**(6 marks)** 1 mark for each working out 1 mark for each correct annual cost of petrol

Q5	**a) Complete the summary table on the following page with all the information you have researched.**	**(2 marks)** 2 marks for filling out table
	b) **Create a graph to compare the annual costs for each vehicle. For each vehicle draw a separate line in a different colour. Label the x axis with each of the cars and the y axis with the annual costs. For each year your graph should consider totalling the following costs:** - Loss from depreciation (e.g car depreciates from $45000 to $35000 will be a cost of $10000 for the year) - Annual fuel cost (Petrol or electric) - Annual interest cost	**(6 marks)** 2 marks for each correct line graphed
	c) Using the space below write an informed conclusion on what car you would consider to be the best buy. Justify your response referring to your research and the graph you have developed in part b.	**(4 marks)** 1 mark for selected car and reason 1 mark for accurate reasoning 2 marks for referring to the graph

Summary Table (2 marks)

Fill in the summary table from the information that you gathered in the first four questions:

Car Type	Petrol	Electric	Hybrid
Cost ($AUD)			
Weekly Repayments			
Estimated interest paid on the loan			
Total estimated cost of the loan			
Five-year salvage value			
Five-year average rate (r)			
Fuel consumption (L or kWh/100km)			
Annual fuel cost			

Attach graph paper here