



YEAR 8 INVESTIGATION

MATHEMATICS

Name: _____

Due Date: Wednesday 27th October 2021 (Week 4)

Mathematics Research Task:

Part 1: In this section you will be assessed on how well you can:

- Use appropriate technology and show appropriate working to solve problems.
 - Communicating**
MA4-1WM communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols
- Solve Problems relating to perimeter and area
 - Problem Solving**
MA4-2WM applies appropriate mathematical techniques to solve problems
- Solve Problems involving purchasing and income
 - Financial Mathematics**
MA4-6NA solves financial problems involving purchasing goods

Brief:

You have been made responsible for the upkeep of Nielson Park in Coonabarabran. Part of your duties is to calculate the cost of mowing and trimming the park, as well as calculating the cost of lawn care material (a fertilizer and herbicide mix) which will be spread over the grass.

You will also need to

- find the perimeter of the park
- find the area of the park
- calculate the total cost of employing “Sam’s Mowing Club” to mow the park.
- calculate the total cost of employing “Jill’s Landscaping” to trim around the park
- calculate the total cost of “MaxiGrow Lawn Care” needed for the park.
- calculate the cost of spreading the “MaxiGrow Lawn Care”

You will use

- Google Maps to find the perimeter and the area of the park.
- A calculator (or similar) to calculate costs.

Assumptions

- Sam’s Mowing Club mows 1.2 ha per hour at a cost of \$60 per hour
- Jill’s Landscaping trims the perimeter of the park at a rate of 450 metres per hour at a cost of \$45 per hour
- Jill’s landscaping will spread the “MaxiGrow Lawn Care” fertilizer. It costs \$3 per kg to apply.
- The park needs “MaxiGrow Lawn Care” fertilizer applied at a rate of 1 kg per 15 square metres.
- We can ignore the buildings

Finding the Perimeter and Area of Nielson Park.

Google Maps has a very handy feature which will allow you to find the perimeter and area.

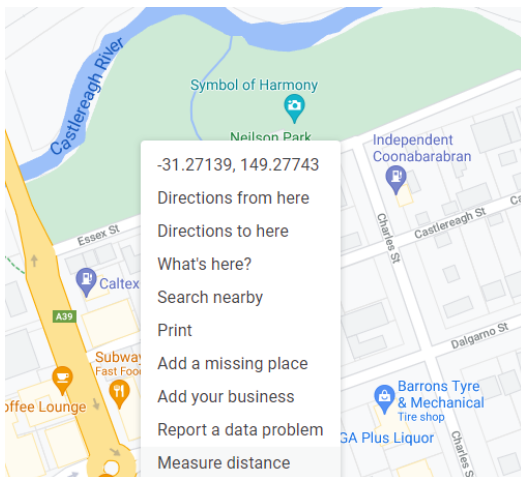
Use Google Chrome to operate Google Maps (you simply need to search for Google Maps).

Make sure you move the view to show Coonabarabran and Nielson Park.

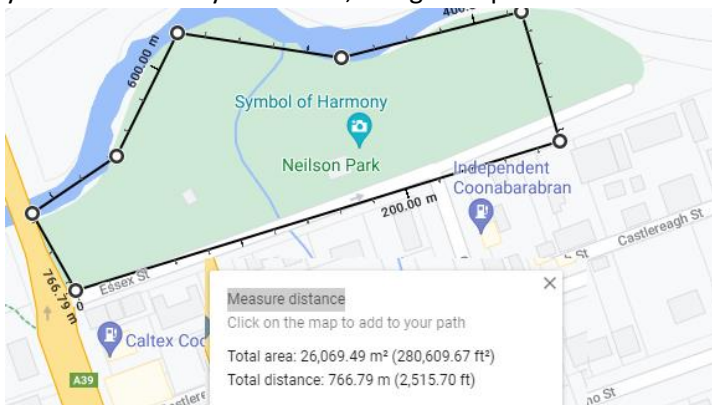
It should look something like this:



If you Right Click on the map you will see a small menu, the bottom choice is 'Measure Distance'



You can now click on extra points (click and HOLD to move the map if you need to) and as long as you finish where you started, Google Maps will do the rest.



If you want to get rid of a dot, click it again. If you want to move a dot, click and HOLD the dot and drag it. DO NOT USE THE SAMPLE NUMBERS.

Marks for this section will be scaled against how accurate your numbers are, compared to the teacher version.

Hint: zoom in and use multiple dots so that you can get accurate values.

Sam's Mowing:

Area of Nielson Park in square metres: _____ (1 mark)

Teacher only (Accuracy: _____/1)

The number of square metres in 1 Hectare: _____ (1 mark)

Area of Nielson Park converted to Hectares (ha):

Working: _____ (2 marks)

Answer: _____ (1 mark)

Time Taken for Sam's Mowing:

Working: _____ (2 marks)

Answer: _____ (1 mark)

Cost of Sam's Mowing:

Working: _____ (2 marks)

Answer: _____ (1 mark)

Jill's Landscaping:

Perimeter of Nielson Park: _____ (1 mark)

Teacher only (Accuracy: _____/1)

Time taken for Jill's Landscaping to trim around the park:

Working: _____ (2 marks)

Answer: _____ (1 mark)

Cost of Jill's Landscaping for trimming around the park

Working: _____ (2 marks)

Answer: _____ (1 mark)

Amount of MaxiGrow Fertilizer needed:

Working: _____ (2 marks)

Answer: _____ (1 mark)

Cost to apply MaxiGrow Fertilizer

Working: _____ (2 marks)

Answer: _____ (1 mark)

Total Cost of Jill's Landscaping

Working: _____ (2 marks)

Answer: _____ (1 mark)

Total Cost for Nielson Park upkeep

Working: _____ (2 marks)

Answer: _____ (1 mark)

Part 2: In this section you will be assessed on how well you can:

- Use appropriate technology and show appropriate working to solve problems.

Communicating

MA4-1WM communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols

- Solve Problems involving purchasing and income

Financial Mathematics

MA4-6NA solves financial problems involving purchasing goods

Brief:

You are employed by “Sam’s Mowing Club”, in charge of finances.

Part A: Sam needs you to purchase a new ride-on lawnmower, getting the best deal that you can for the money, considering that Sam cannot afford to buy a mower outright.

There are three options available – you will calculate the best buy.

Option 1:



Rover Mini Rider

Price \$5350

10% deposit then monthly repayments of \$155 for three years

Option 2:



John Deere X300 Select Series

\$1500 deposit then monthly repayments of \$189 per month for 2 years.

Option 3:



Cox LawnBOSS

\$1000 deposit then payments of \$65 per week for 2 years

Calculations:

Option 1:

Deposit: _____ (1 marks)

Payments (\$155 per month for 3 years): _____ (1 marks)

Total cost of Option 1 _____ (1 mark)

Option 2:

Payments (\$189 per month for 2 years): _____ (1 marks)

Total cost of Option 2 _____ (1 mark)

Option 3:

Total cost of Option 3: _____ (2 marks)

The best buy is: _____ (1 mark)

Part B:

You will need to calculate the amount that “Sam’s Mowing Club” can put aside for purchasing the mower. Sam can afford each of the deposits but then can only to allocate 15% of his monthly profit.

Profit is the amount of money you are ahead after buying and selling.

Income:

Lawnmowing: \$4900 per month

Costs:

Fuel: 55 Litres per month at \$1.85 per Litre

Oil: \$23 per month

Workers: \$2300 per month

Total Income per month = \$4900

Total costs per month:

Working: _____ (2 marks)

Answer: _____ (1 mark)

Profit per month: _____ (1 mark)

Total amount Sam can afford per month: _____ (2 marks)

Can Sam afford the best buy (yes / no) _____ (1 mark)