

CBA1 Mathematical Investigation: Dog Walking

# THE MOST EFFICIENT ROUTE TO TAKE MY DOG ON A WALK

## MY PROBLEM STATEMENT:

I AM TRYING TO FIND THE MOST EFFICIENT ROUTE IN MY ESTATE TO TAKE MY DOG ON A WALK.

## WHY I CHOSE IT:

I CHOOSE THIS PROBLEM BECAUSE I WALK MY DOG A FEW TIMES A WEEK BUT I DON'T EVEN KNOW IF HE'S GETTING THE WALK HE NEEDS.

Poses a concise  
problem  
statement

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### ASSUMPTIONS

I assume that there will be variables that will affect the results, such as...

- We will be walking at a different pace each time because some days I could be tired which would make me walk slower.
- There will be things that could distract my dog like other dogs, cats, cars or people which will make him stop, slowing us down.
- The weather will have an impact on the results for example if it were to rain I would walk faster to get out of it or if it's windy I would walk slower if the wind was blowing against me.
- He will stop to go to the toilet or he could stop to smell which will affect the time it takes to walk each route.
- Therefore I will take each route three times and calculate the average time it takes to walk each route because if I were to walk the most efficient route and we didn't stop I need to make sure it is still enough time for him.

Simplifies the problem by making assumptions

### STEPS

1. Determine how long my dog needs to be walked for every day because I need to find out how long he needs to be walked for before I go planning routes.

2. Map out my estate and identify potential routes for walking him. I'll need to make sure the routes are going to be roughly the time he needs to be walked for because there's no point in picking 4 routes that are going to be too much / too little for him.

3. Walk each route three times, time the walk and measure the distance. Then calculate the average time it takes to walk each route because I'm not going to get the same time every time I walk each route.

4. After each route is walked I will write a note of any variables that may have occurred and any predictions I may have.

5. Display results on a table and bar charts.

6. Compare the time it takes to walk each route and the distance of each route to how long my dog needs to be walked for and find the most efficient route.

7. Refer back to the most efficient route and check that it would still be the most efficient even if my dog wasn't distracted or didn't go to the toilet because if I were to walk him and he didn't get distracted or go toilet I still need to make sure that the route I'm taking him on is the most efficient.

8. Work out the best route for other breeds of dogs.

Justifies the use of a suitable strategy to engage with the problem

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### HOW LONG MY DOG NEEDS TO BE WALKED FOR

- My dog is a zuchon and he needs a 30 minute walk every single day.
- He needs to walk at least 1.5km every day.
- I need to find routes that take about 30 minutes to walk and are over 1.5km.
- I could also find a 15 minute route and walk it twice.

I found out the time and distance a zuchon and other breeds need to be walked for on these websites:

- [Petguide.com](http://Petguide.com)
- [wagwalking.com](http://wagwalking.com)
- [animalso.com](http://animalso.com)

### ROUTE 1

Distance: 1.5km

Lap 1- 17:53

Lap 2- 16:51

Lap 3- 15:16

Average- 16:36



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### ROUTE 1

How I found the average

Add all the minutes:  $17 + 16 + 15 = 48$

Add all the seconds:  $53 + 51 + 16 = 120$

Convert seconds to minutes:  $120 \text{ Seconds} = 2 \text{ Minutes}$

Total minutes:  $48 + 2 = 50$

Divide total minutes by three:  $50 \div 3 = 16.6$

= 16 minutes and 36 Seconds

### ROUTE 1

#### Notes

Variables:

Lap 1 - There were a few other dogs that distracted my dog and he went to the toilet a few times which slowed us down.

Lap 2 - There weren't as many distractions so we walked the route faster.

Lap 3 - There were no distractions and he didn't stop to go to the toilet therefore we walked the route the quickest.

Predictions:

This route is close to 15 minutes so if you walk this route twice it could be the most efficient. Although route 2 is a bit shorter so it could be closer to 15 mins.

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### ROUTE 2

Distance: 1.3km

Lap 1- 17:56

Lap 2- 14:36

Lap 3- 15:21

Average- 15:38



Suitable mathematical procedures are followed and accurate mathematical language, and visual representations are used

### ROUTE 2

How I found the average

Add all the Minutes:  $17 + 15 + 14 = 46$

Add all the Seconds  $56 + 36 + 21 = 113$

Divide total minutes by three:  $46 \div 3 = 15$  (15.3 rounded down)

Divide total seconds by three:  $113 \div 3 = 38$  (37.6 rounded up)

= 15 minutes 38 seconds

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### ROUTE 2

#### Notes

##### Variables:

Lap 1 - He went to the toilet a few times which slowed us down.

Lap 2 - There were no distractions.

Lap 3 - He went to the toilet once but apart from that there were no distractions.

##### Predictions:

I think this route could be the most efficient because it is closer to 15 mins then route 1.

### ROUTE 3

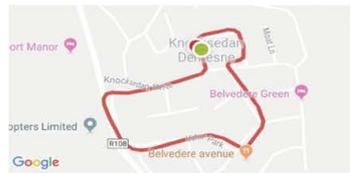
Distance: 1.2km

Lap 1- 14:54

Lap 2- 12:32

Lap 3- 12:01

Average- 13:29



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### ROUTE 3

How I found the average

Add all the Minutes:  $14 + 12 + 12 = 38$

Add all the Seconds:  $54 + 32 + 1 = 87$

Divide total minutes by three:  $38 \div 3 = 13$  (12.6 rounded up)

Divide total seconds by three:  $87 \div 3 = 29$

= 13 minutes 29 seconds

### ROUTE 3

#### Notes

Variables:

Lap 1 - There weren't many things to distract him but he went to the toilet a few times.

Lap 2 - There were no distractions.

Lap 3 - It started to rain so I started to walk faster which meant that we walked the route the quickest.

Predictions:

This won't be the most efficient route because route 2 is closer to 15 minutes.

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### ROUTE 4

Distance: 1.8km

Lap 1- 22:45

Lap 2- 21:59

Lap 3- 22: 23

Average- 22:42



### ROUTE 4

How I found the average

Add all the minutes;  $21 + 22 + 22 = 65$

Add all the seconds:  $45 + 59 + 23 = 127$

Divide total minutes by three:  $65 \div 3 = 22$  (21.6 rounded up)

Divide total seconds by three:  $127 \div 3 = 42$  (42.3 rounded down)

= 22 minutes 42 seconds

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### ROUTE 4

#### Notes

##### Variables:

Lap 1 - There were a few dogs which distracted him.

Lap 2- There were no distractions and he didn't stop to go to the toilet, therefore we walked the route the quickest.

Lap 3 - He went to the toilet which slowed us down a bit.

##### Predictions:

This route is the longest however it is not the most efficient for my dog. However it probably be the most efficient route for bigger breeds of dogs.

Identifies any relevant variables e.g. time

### Table

	Minutes	Km
<b>He should get:</b>	<b>30</b>	<b>1.5</b>
Route 1	33:12	3.0
Route 2	31:16	2.6
Route 3	26:58	2.4
Route 4	45:24	3.6

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### Charts



Visual representations are used

### CONCLUSION:

I DISCOVERED THAT ROUTE 2 IS 1.3KM AND 15:38 IN MINUTES, SO IF YOU WALK THIS ROUTE TWICE THAT MAKES IT 2.6KM AND 31:16 MINUTES MAKING THIS ROUTE THE MOST EFFICIENT FOR MY DOG.

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### REFERRING BACK TO ROUTE 2

I'm going to refer back to route 2 to see if it really is the most efficient route.

- I'm going to look back at the variables and see if I were to walk it again and he didn't stop or get distracted would it still be the most efficient route.

Lap 1- he went to the toilet a few times.

Lap 2- there were no distractions.

Lap 3- there were a few dogs.

•Because there were no distractions in lap 2 I'm going to take the time from that lap and see would it still work out to be the most efficient route.

•So in Lap 2 I got 14:36 which is still really close to 15 minutes so Route 2 is definitely the most definitely efficient route.

Checks reasonableness of solution and revisits assumptions

Uses every day familiar language to communicate ideas

### Other Breeds

I'm going to find the most efficient route for other breeds of dogs.

Pug- needs 20-25 minute walk so Route 4 would be the most efficient.

Golden Retriever- needs 45-60 minute walk so you could walk Route 4 three times.

Yorkshire Terrier- Needs 20 minute walk so Route 4 would be the most efficient.

German Shepherd- Needs 30-45 minute walk so you could walk Route 4 two times or Route 2 three times.

Shih Tzu- Needs 20 minute walk so Route 4 would be the most efficient.

- Obviously other breeds don't walk at the same pace as my dog, this is just a roughly.
- Route 4 seems to be the most popular route for other breeds of dogs.
- Bigger dogs need longer walks eg. 45-60 mins
- Smaller dogs like mine need shorter walks eg. 20-30 mins

Solution is extended to other situations (i.e. other breeds of dogs)

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### REFLECTION

#### Things I learnt doing my CBA:

- I've learnt how to find the average of time.
- How to approach a problem to solve it.
- How to map out routes, time and measure distances.

#### What I did well:

- I was able to come up with steps to solve my problem and then followed those steps.
- I analyzed the results and displayed them well.

#### Things I didn't do well:

- I could've included more maths.

#### Things I would change:

- I would do more routes if I had more time.
- I would look more into different breeds more eg. find out how fast they walk and compare that to how fast my dog walks etc.
- I would've liked to include algebra in my CBA, however I couldn't really find anywhere to use it and I feel like I'd be putting it in just for the sake of it.

Identifies what worked well and what could be improved

### IF I WERE TO DO THIS AGAIN WHAT CHANGES WOULD I MAKE

- I would do more routes if I had more time.
- I would look more into different breeds like find out how fast they walk etc.
- I would've liked to include algebra in my CBA, however I couldn't really find anywhere to use it and I feel like I'd be putting it in just for the sake of it.

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THANKS FOR READING  
MY CBA  
HOPE YOU ENJOYED IT.



**Overall judgement:**  In line with expectations

 Exceptional

 Above expectations

 In line with expectations

 Yet to meet expectations