Check Up


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1. Namet is considering purchasing one of two used cars. The cost to buy the first car is $14 500 and it will cost approximately $0.26 per km for fuel and maintenance. The cost to buy the second car is $12 000 and it will cost approximately $0.29 per km for fuel and maintenance. After how many kilometres of driving will the cost of the two cars be equal?

   a. Write a system of equations to represent this scenario. (Modelling)

   b. Solve the system of equations. (Analysis)

   c. After how many kilometres of driving will the cost of the two cars be equal? (Interpretation)

   d. Does the conclusion agree with the original information? (Was the problem solved?)

☑ Compare your answers.

2. Namet is considering purchasing one of two used cars. The cost to buy the first car is $14 500 and it will cost approximately $0.26 per km for fuel and maintenance. The cost to buy the second car is $12 000 and it will cost approximately $0.29 per km for fuel and maintenance. After how many kilometres of driving will the cost of the two cars be equal?


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a. Write a system of equations to represent this scenario. (Modelling)

Let C be the total cost of ownership and let K be the number of kilometres driven.

	Price ($)	Kilometres Driven	Cost per Kilometre ($)	Fuel and Maintenance Total($)	Total Cost
Car 1	$14 500	K	0.26	$0.26K$	$0.26K + 14\,500$
Car 2	$12 000	K	0.29	$0.29K$	$0.29K + 12\,000$

$C = 0.26K + 14\,500$

$C = 0.29K + 12\,000$

b. Solve the system of equations. (Analysis)

$$\begin{aligned} C &= 0.26K + 14\,500 \\ -(C &= 0.29K + 12\,000) \\ \hline 0 &= -0.03K + 2\,500 \\ 0.03K &= 2\,500 \\ K &= 83\,333.\overline{3} \end{aligned}$$

$C = 0.26K + 14\,500$

$C = 0.26(83\,333.\overline{3}) + 14\,500$

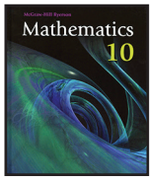
$C = 36\,166.\overline{6}$

c. After how many kilometres of driving will the cost of the two cars be equal? (Interpretation)

The costs will be equal after approximately 83 333 km.

d. Does the conclusion agree with the original information? (Was the problem solved?)

Yes. After driving approximately 83 333 km, both cars will have cost approximately $36 167.



For further information about solving problems using systems of linear equations, see pp. 432 – 439 and 492 – 498 of *Mathematics 10*.

Multimedia

Additional video examples pertaining to this lesson have been provided.

The problems used in a math course, like this one, often seem trivial or contrived. That is because they often are. Modelling is generally the most difficult part of solving a problem using mathematics. This is true for the greatly simplified situations seen in a mathematics course, but it is especially true for genuine real-world problems, which are often extremely complex, and whose modelling difficulty would go well beyond the scope of this course. Think of the simplified problems in this course as stepping stones to solving more complex problems. Consider Claire's farmer's market stall problem, for example. Most businesses don't sell a single product and most have more than two types of expenses. However, all businesses are very interested in knowing the amount of money spent compared to the amount of money brought in. The farmer's market problem provides a simplified version of the big question all businesses have, "is the business going to make money?"

Systems of Linear Equations Summary

A system of equations is simply a group of equations that involve the same variables. Solving a system of equations means determining values for each variable that make all of the equations true.

This *Unit* focused on solving systems of linear equations, but the solution methods you have learned – graphing, substitution, and elimination – can all be applied to systems of equations that are not linear. In future math courses, you will learn how to solve non-linear systems.