ST. JEAN DE BREBEUF MATHEMATICS

CHAPTER 9.5

OPERATE A VEHICLE

CHAPTER 9.5 OPERATE A VEHICLE

KEY CONCEPTS

Fixed costs are expenses that **remain the same** from one month to the next

Variable costs are expenses that **vary in their amount or their frequency**.

Depreciation is the amount by which a vehicle **loses value** over time.

One of the major expenses for drivers is **insurance**.
→This is especially true for young drivers.

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EXAMPLE 1 *Insuring a Vehicle*

Armando is 19 and single, and he owns a seven-year-old 2-door Honda. He called several insurance agents and the lowest quote he received was **$3480** per year. There are two payment options

Option 1: He can pay the insurance premium in full ($3480) once a year

Option 2: He can make **monthly payments of $300**.

(a) Calculate the **annual cost** if he chooses the **monthly instalments**.

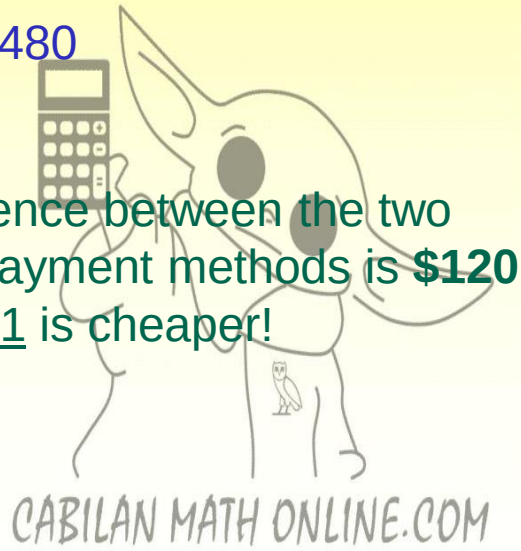
He will make **12 payments/year**
= $300 x 12
= **$3600**

The annual (yearly) cost is **$3600** if payments are made monthly.

(b) Calculate the **difference** between the two payment methods.

$3600 – 3480
= **$120**

The difference between the two different payment methods is **$120**
→ Option 1 is cheaper!



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EXAMPLE 1 *Insuring a Vehicle*

Armando is 19 and single, and he owns a seven-year-old 2-door Honda. He called several insurance agents and the lowest quote he received was **$3480** per year. There are two payment options

(c) Suggest reasons why Armando might choose each option.

Option 1:

Much cheaper!!!

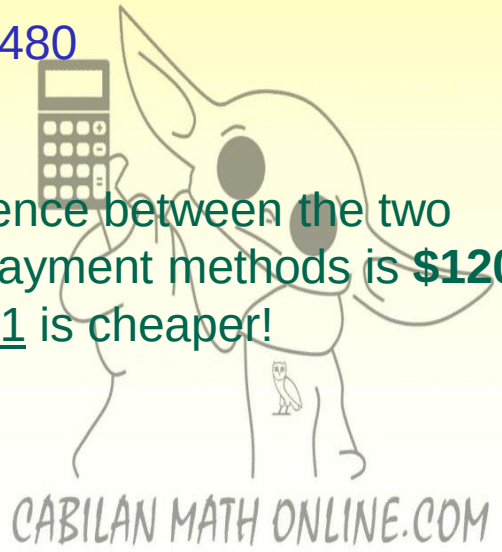
Option 2:

Might not have all of the money up front

(b) Calculate the **difference** between the two payment methods.

$3600 – 3480
= **$120**

The difference between the two different payment methods is **$120**
→ Option 1 is cheaper!



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EXAMPLE 2 *Calculating Fuel Costs*

Omarion's truck has a **108 L** fuel tank and a fuel efficiency rating of **12.0 L/100 km**.

(a) Explain what the **fuel efficiency rating** on Omarion's truck means.

Tells us how much gas is consumed over a certain distance

(b) <u>How far</u> can Omarion's truck travel on **one tank** of fuel?

Easiest to set up a *proportion* and solve for the unknown amount
→ Let "x" represent the distance travelled on one tank (108 L) of fuel

$$\frac{12.0\,L}{100\,km} = \frac{108\,L}{x}$$

* Cross-multiply

$$\frac{12.0x}{12.0} = \frac{10800}{12.0}$$

$$x = 900$$

Omarion's truck can travel **900 km** on one tank of gas

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EXAMPLE 2 *Calculating Fuel Costs*

Omarion's truck has a **108 L** fuel tank and a fuel efficiency rating of **12.0 L/100 km**.

(c) How much fuel would his truck use on a **500 km** trip?

Easiest to set up a *proportion* and solve for the unknown amount
→ Let "x" represent the amount of fuel used on a 500 km trip

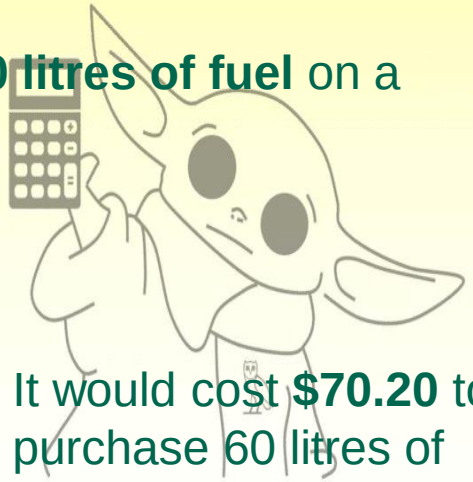
$$\frac{12.0\,L}{100\,km} = \frac{x}{500\,km}$$

* Cross-multiply

$$\frac{100x}{100} = \frac{6000}{100}$$

$$x = 60$$

Omarion's truck would use **60 litres of fuel** on a 500 km trip.



(d) Omarion's truck uses *Unleaded* fuel and the cost of gas is **$1.17/L**. How much would it cost for the amount of fuel in Part (c)?

Price x # of litres
= $1.17 x 60
= **$70.20**

It would cost **$70.20** to purchase 60 litres of gas.

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EXAMPLE 3 *Car Depreciation*

Steven purchased a brand new BMW for **$42 000**. It is expected to depreciate at a rate of **30% per year**.

Note: If a car depreciates **30% per year**, it means it will keep **70** % of its value every year

100 – 30
= **70**

(a) What is the value of the vehicle after the **first year**?

$42 000 x 70%
= $42 000 x 0.7
= **$29 400**

70 / 100
= **0.7**

The value of the car will be **$29 400** after the first year.

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EXAMPLE 3 *Car Depreciation*

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Note: If a car depreciates **30% per year**, it means it will keep **70** % of its value every year

100 – 30
= **70**

The value of the car will be **$29 400** after the first year.

(b) What is the value of the vehicle after the **second year**?

$29 400 x 70%
= $29 400 x 0.7
= **$20 580**

70 / 100
= **0.7**

The value of the car will be **$20 580** after the first year.

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EXAMPLE 4 *Car Depreciation*

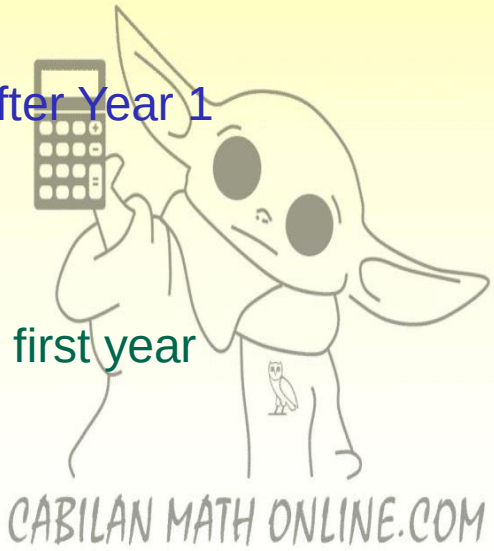
A new luxury vehicle sells for **$82 100**. Stephan researched used cars of the same model and found the following information.

AGE OF VEHICLE (YEARS)	AVERAGE SELLING PRICE ($)
1	$49 260.00
2	$25 615.20
3	$12 039.14
4	$5 176.93

(a) Calculate the *actual depreciation* of the vehicle during the **first year**, in dollars.

Actual depreciation = Price of new car – price of car after Year 1
= $82 100 – 49 260
= **$32 840**

The actual depreciation of the vehicle during the first year is **$32 840**.



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1	$49 260.00
2	$25 615.20
3	$12 039.14
4	$5 176.93

(b) Calculate the *depreciation* after **one year**, as a percent of the new vehicle price.

$$Percent depreciation = \frac{Actual\ depreciation}{New vehicle\ price} \times 100$$

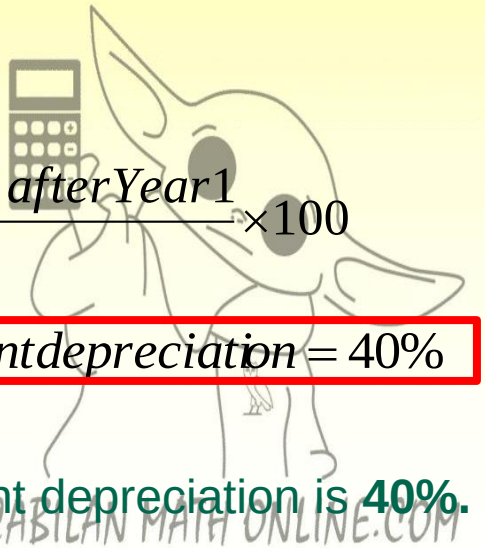
$$Percent depreciation = \frac{Price of\ new car - Price of\ car\ after Year 1}{New vehicle\ price} \times 100$$

$$Percent depreciation = \frac{82100 - 49260}{82100} \times 100$$

$$Percent depreciation = \frac{32840}{82100} \times 100$$

$$Percent depreciation = 0.4 \times 100$$

$$Percent depreciation = 40\%$$



The percent depreciation is **40%.**

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EXAMPLE 4 *Car Depreciation*

A new luxury vehicle sells for **$82 100**. Stephan researched used cars of the same model and found the following information.

AGE OF VEHICLE (YEARS)	AVERAGE SELLING PRICE ($)
1	$49 260.00
2	$25 615.20
3	$12 039.14
4	$5 176.93

(c) Calculate the *depreciation* after **four years**, as a percent of the new vehicle price.

$$Percent depreciation = \frac{Actual\ depreciation}{New vehicle\ price} \times 100$$

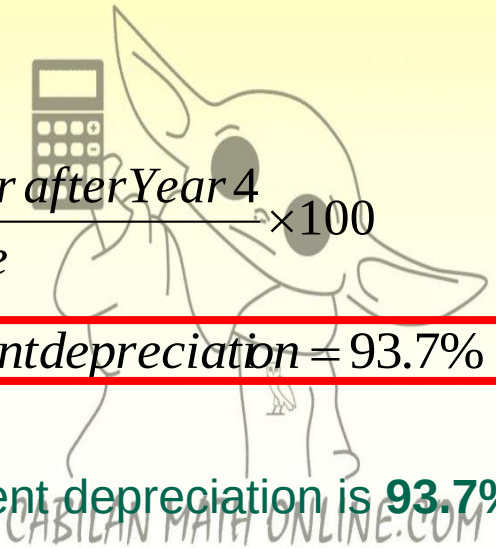
$$Percent depreciation = \frac{Price of\ new car - Price of\ car\ after Year\ 4}{New vehicle\ price} \times 100$$

$$Percent depreciation = \frac{82100 - 5176.93}{82100} \times 100$$

$$Percent depreciation = \frac{76923.07}{82100} \times 100$$

$$Percent depreciation = 0.9369 \times 100$$

$$Percent depreciation = 93.7\%$$



The percent depreciation is **93.7%.**

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