

HOMEWORK QUESTIONS...

12. Raul got a \$200 cash advance using his credit card, which charges 19.995%, compounded daily. He already had a balance of \$481.73.
- a) Suppose that Raul wanted to pay off his credit card in 2 months. How much would he need to pay each month? How much interest would he pay?
 - b) Suppose that Raul wanted to pay \$50 each month until he paid off his credit card. How long would this take? How much interest would he pay?

a)

```

N=2
I%=19.995
PV=681.73
PMT=-349.47734...
FV=0
P/Y=12
C/Y=365
PMT: [ ] [ ] BEGIN
    
```

Payment
\$349.48

```

2*349.48      698.96
Ans-681.73    17.23
    
```

Paid
Interest

b)

```

N=15.61426037
I%=19.995
PV=681.73
PMT=-50
FV=0
P/Y=12
C/Y=365
PMT: [ ] [ ] BEGIN
    
```

of
payments

Paid 16 months

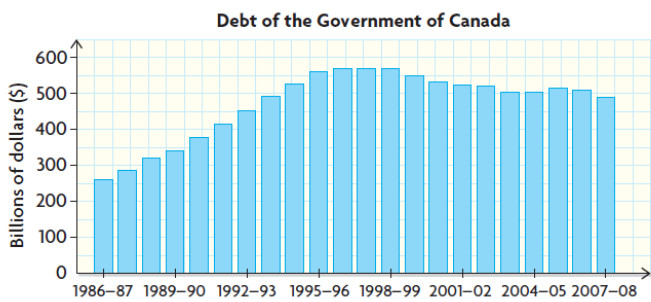
Interest

```

15.614*50      780.7
Ans-681.73     98.97
    
```

Math in Action

Paying the National Debt



Public Accounts of Canada; Statistics Canada

Canada's national debt fluctuates. It is affected by financial markets (such as the stock, bond, currency, and commodity markets), the gross domestic product (the gross value of all goods and services produced in the country), and the federal budget (the federal government's income and expenditures for the fiscal year). The national debt exceeded \$100 billion in 1981, \$200 billion in 1985, and \$300 billion in 1988. The size of the national debt is continually changing and is available on the national debt clock.

- Estimate the most recent value for the national debt.
- If the debt were shared equally by all Canadians, what would be the debt per person?

9.4

Buy, Rent, or Lease?

lease

A contract for purchasing the use of property, such as a building or vehicle, from another, the lessor, for a specified period.

equity

The difference between the value of an item and the amount still owing on it; can be thought of as the portion owned. For example, if a \$25 000 down payment is made on a \$230 000 home, \$205 000 is still owing and \$25 000 is the equity or portion owned.

asset

An item or a portion of an item owned; also known as property. Assets include such items as real estate, investment portfolios, vehicles, art, and gems.

LEARN ABOUT the Math

Amanda is a civil engineer. She needs a vehicle for work, on average, 12 days each month. She has been renting a vehicle when she needs it.



The advantage to renting is that she simply fills the gas tank and drops off the vehicle when she is done with it. The disadvantage is that she has to spend time arranging for the rental, picking up the vehicle, and getting home after dropping it off. She is wondering if renting is the most economical choice and is considering her options:

- She could **lease** a vehicle, which requires a down payment of \$4000 and lease payments of \$380 per month plus tax. She would need insurance at \$1220 each year (which could be paid monthly) and would have to pay for repairs and some maintenance, which would average \$50 each month. For the 4-year lease she is looking at, she would have no **equity** in the vehicle at the end of the term, since the car would belong to the leasing company.
- She could buy a vehicle for \$32 800 and finance it for a 4-year term at 4.5% interest, compounded monthly. She would have the same insurance, repair, and maintenance costs that she would have with leasing. However, the equity of the vehicle would be considered an **asset**.
- She could continue to rent at \$49.99 per day, plus tax, with unlimited kilometres.

Lease?

Buy?

Rent?

Which option would you recommend for Amanda, and why?

RENT

$$49.99 * 1.15 * 12 * 12 * 4 = 33113.376$$

No equity

LEASE

$$4000 + 380 * 1.15 * 48 + 1220 * 4 + 50 * 48 = 32256 +$$

No equity

Buy

```
N=48
I%=4.5
PV=32800
PMT=-747.95434...
FV=0
P/Y=12
C/Y=12
PMT: [ ] [ ] [ ] BEGIN
```

$$747.95 * 48 + 1220 * 4 + 50 * 48 = 43181.6$$

Asset

appreciation

Increase in the value of an asset over time.

→ Multiply by $1 + \%$ as a decimal
ex 15% tax ($\times 1.15$)

depreciation

Decrease in the value of an asset over time.

→ Multiply by $1 - \%$ as a decimal
ex 20% discount ($\times 0.80$)

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APPLY the Math

EXAMPLE 2 Solving a problem that involves vehicle depreciation

A luxury vehicle rental company depreciates the value of its vehicles each year over 5 years. At the end of the fifth year, the company writes off a vehicle for its scrap value. The company uses a depreciation rate of 40% a year.

- a) What is the scrap value of each car below?
 - i) Car A, which is currently 2 years old and has a value of \$43 200
 - ii) Car B, which is currently 1 year old and has a value of \$75 600
- b) What was the original purchase price of each car?

a) (A)

$43200 * 0.6$	25920
Ans $* 0.6$	15552
	9331.2

*3rd
4th
5th*

(B)

$75600 * 0.6$	45360
Ans $* 0.6$	27216
	16329.6
	9797.76

*2nd
3rd
4th*

b)

$43200 / 0.6$	72000
Ans $ / 0.6$	120000

*1st
NEW*

New

$75600 / 0.6$	126000
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EXAMPLE 3 p. 562 Solving a problem that involves leasing or buying a water heater

The 10-year-old hot water heater in Tom's home stopped working, so he needs a new one. Tom works for minimum wage. After paying his monthly expenses, he has \$35 **disposable income** left. He has an unused credit card that charges 18.7%, compounded daily. He has two options:



disposable income
The amount of income that someone has available to spend after all regular expenses and taxes have been deducted.

- Tom could lease from his utility company for \$17.25 per month. This would include parts and service.
 - He could buy a water heater for \$712.99, plus an installation fee of \$250, using his credit card. He could afford to pay no more than \$35 each month.
- a) What costs are associated with buying and leasing?
 b) What do you recommend for Tom? Justify your recommendation.
 c) Suppose that the life expectancy of a water heater is 8 years. Would this change your recommendation? Explain.

a) Lease

No

Buy - BEST

17.25*12*10
2070

N=36.30739057
 I%=18.7
 PV=962.99
 PMT=-35
 FV=0
 P/Y=12
 C/Y=365
 PMT: END BEGIN

36.307*35
1270.745 +

c)

17.25*12*8
1656

In Summary**Key Ideas**

- When deciding whether to rent, buy (with or without financing), or lease, each situation is unique. A cost and benefit analysis should take everything into account.
 - Costs include initial costs and fees, short-term costs, long-term costs, disposable income, the cost of financing, depreciation and appreciation, penalties for breaking contracts, and equity.
 - Benefits include convenience, commitments, flexibility, and personal needs or wants, such as how often you want to buy a new car.
- Since each situation is unique, it is impossible to generalize about whether renting, leasing, or buying is best.

Need to Know

- When renting, leasing, and buying, you often need to make payments up front. Some payments go toward the overall cost, such as a down payment on a house or a lease deposit and the first and last month's rent. Other deposits, such as a rental damage deposit, are refunded at a later date.
- Appreciation and depreciation affect the value of a piece of property and should be considered when making decisions about renting, buying, or leasing, based on the particular situation. They are usually expressed as a rate per annum.
- Equity can make buying a house a form of investment.

HOMEWORK...

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