

# QUESTIONS...

5. Susie purchased a limited edition print of a Robert Bateman painting for \$7800. Bateman's prints appreciate, on average, 1.5% annually.
- a) How long will Susie need to keep the print until its value exceeds \$10 000?
  - b) About how long will Susie need to keep the print until its value has doubled?

a)

9325.821737
9465.709063
9607.694699
9751.81012
9898.087272
10046.55858
10197.25696

17th year

b)

$$\frac{72}{1.5} = 48 \text{ years}$$

$$7800(1.015)^{47}$$

$$15703.577$$

47 years double

6. Jake and Archie are looking for places to live.
- Jake decides to rent a house for \$1400 per month.
  - Archie buys a house for \$189 900, with a down payment of 10%. The bank has offered Archie a 20-year mortgage for the remainder of the cost, at 4% compounded semi-annually, with payments every two weeks.
- Jake and Archie both move after 5 years. Archie's house has depreciated by 2% per year. Compare Jake's and Archie's housing costs.

Jake (Rent)

```
1400*12*5
- 84000
No Equity
```

Archie (Buy)

← Bi-weekly payment

```
N=520
I% = 4
PV = 170910
PMT = 476.215394
FV = 0
P/Y = 26
C/Y = 2
PMT: [ ] [ ] BEGIN
```

```
N=130
I% = 4
PV = 170910
PMT = -476.215394
FV = 139927.2952
P/Y = 26
C/Y = 2
PMT: [ ] [ ] BEGIN
```

← owe on your mortgage

NEW

```
189900*.98
Ans*.98
186102
182379.96
178732.3608
175157.7136
171654.5593
```

Sold

← Value after 5 years

```
171654.56-139927
.30
31727.26
Ans-18990
12737.26
```

Profit

```
476.22*5*26
61908.6
12737.26-61908.6
-49171.34
```

Paid out

← Cost  
No Equity

**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.
- What costs are associated with buying and leasing?
  - What do you recommend for Tom? Justify your recommendation.
  - Suppose that the life expectancy of a water heater is 8 years. Would this change your recommendation? Explain.

a) Lease

$$17.25 * 12 * 10 = 2070$$

buy (b)

```

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

36 months

$$36.307 * 35 = 1270.745$$

+ paid

c)

$$17.25 * 8 * 12 = 1656$$

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**EXAMPLE 4**

Solving a problem that involves leasing or buying offi

Lance started his own construction business 2 years ago. His business has grown quickly, and his home office is no longer big enough. He is considering these two options:

- He could sign a 3-year lease on office space, with monthly rental payments of \$2000, and a refundable damage deposit of \$2000, but there is a penalty for breaking the lease.
  - He could purchase a house for \$285 000 and renovate so it could be used as an office. A 5% down payment would be required, and he would take out a 15-year mortgage at 5%, compounded semi-annually, with monthly payments. Assume appreciation of 2% yearly.
- What are the costs of leasing over 15 years?
  - What are the costs of buying over 15 years?
  - What do you recommend for Lance? Justify your advice.

*Lease*

```
2000+2000*12*15
362000
```

*Sell*

```
285000(1.02)^15
383572.4764
```

*Buy*

```
N=180
I%=5
PV=270750
PMT=-2133.8452...
FV=0
P/Y=12
C/Y=2
PMT: [ ] BEGIN
```

```
180*2133.85
384093
Ans+14250
398343
```

```
383572.48-398343
-14770.52
```

*Monthly payment*

*Cost*

*OVERALL LOSS*  
*Buy*

HOMEWORK: p. 569 #7, 8, 10