HOMEWORK Questions...

p. 457: #1, 2

p. 468: #2, 6, 7

Simple

I = Prt

&

A = P + I

A = P + Prt

A= P(1 + rt)

Compound

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$I = A - P$$

2. Sydney wants to open a savings account. He has $6500 to deposit. He intends to keep the account for 4 years and then use the money to rebuild the engine of his car. Which account should he choose? Justify your choice.
   A. 5.1% simple interest, paid weekly
   B. 4.8% compound interest, paid annually

(A) $A = P + Prt$

$= 6500 + 6500(0.051)(4)$

$= \$7826$

(B) $A = 6500\left(1 + \frac{0.048}{1}\right)^{4}$

$= \$7840.77$

6. Trust funds are investments that are set up for a specific purpose. A local business invested $250 000 in a charitable trust fund so that a school can offer scholarships. The interest rate is 3.8%, compounded semi-annually. Only the interest earned can be used to provide the scholarships. How much is available from the trust fund for scholarships each year?

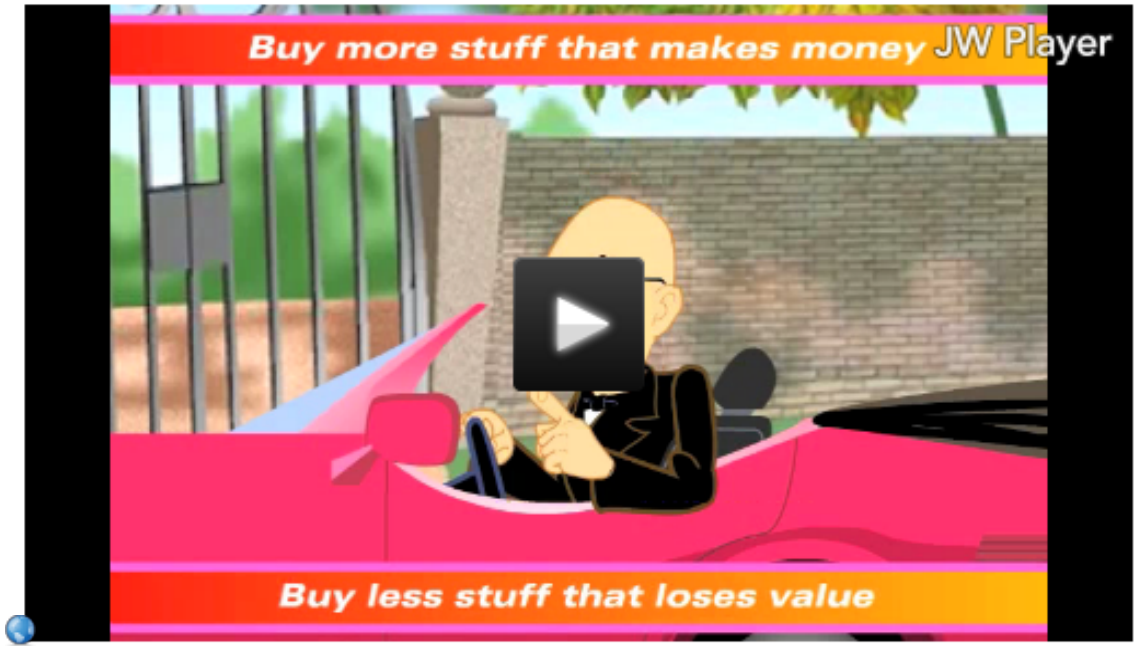
$$A = 250\,000\left(1 + \frac{0.038}{2}\right)^{2\times 1}$$

$$A = 259\,590.25$$

$$I = 259\,590.25 - 250\,000$$

$$I = \$9590.25$$

How to make money???



EXAMPLE 4 p. 463

Comparing interest on investments with different compounding periods

Céline wants to invest $3000 so that she can buy a new car in the next 5 years. Céline has the following investment options:

A. 4.8% compounded annually
B. 4.8% compounded semi-annually
C. 4.8% compounded monthly
D. 4.8% compounded weekly
E. 4.8% compounded daily

BANKS


```
3000(1+0.048/1)^
5
      3792.518151
```

```
3000(1+0.048/2)^
10
      3802.951801
```

```
3000(1+0.048/12)
^60
      3811.922156
```

```
3000(1+0.048/52)
^(52*5)
      3813.325288
```

```
3000(1+0.048/365
)^(365*5)
      3813.687273
```

p. 465

Rule of 72

A simple formula for estimating the doubling time of an investment; 72 is divided by the annual interest rate as a percent to estimate the doubling time of an investment in years.

The Rule of 72 is most accurate when the interest is compounded annually.

EXAMPLE 5 Estimating doubling times for investments

Both Berta and Kris invested $5000 by purchasing Canada Savings Bonds. Berta's CSB earns 8%, compounded annually, while Kris's CSB earns 9%, compounded annually.

a) Estimate the doubling time for each CSB.

$$\text{Rule of } 72 = \frac{72}{\text{Rate}}$$

a) Berta (8%) Kris (9%)

$\frac{72}{8} = 9$ years $\frac{72}{9} = 8$ yrs

Present Value...

$ needed to invest NOW to get a fixed amount later

$$P = \frac{A}{\left(1+\frac{r}{n}\right)^{nt}}$$

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$

$$\frac{A}{\left(1+\frac{r}{n}\right)^{nt}} = \frac{P\left(1+\frac{r}{n}\right)^{nt}}{\left(1+\frac{r}{n}\right)^{nt}}$$

8.4 Compound Interest: Present Value

GOAL

Determine the principal or present value of an investment, given its future value and compound interest rate.

EXAMPLE 2 p. 475 — Determining the present value of an investment that is compounded quarterly

Agnes and Bill are musicians. They have researched the costs to set up a small recording studio. They estimate that $40 000 will pay for the soundproofing, recording equipment, and computer hardware and software that they need. They plan to set up the studio in 3 years and have invested money at 9.6%, compounded quarterly, to save for it.

a) How much money should they have invested?
b) How much interest will they earn over the term of their investment?

A, r, t, P = ?

a) $P = \frac{A}{(1+\frac{r}{n})^{nt}}$

$= \frac{40000}{(1+\frac{0.096}{4})^{4\times 3}}$

$=$

```
40000/(1+0.096/4
)^12
        30092.65538
```

b) $I = A - P$

$= 40000$

$- 30092.66$

$\$9907.34$

HOMEWORK...

p. 468: **Rule of 72...**

#3 (only estimate the doubling time)

#5a & #8

Compound Interest (Future Value)

#10 & #12

p. 478: **Compound Interest (Present Value)**

#4, #6, #7, & #9