

Investing Review

1. Hal invested \$40 000 at an interest rate of 6%, compounded annually. He wants to know how long it will take for the investment to double.
- Estimate the doubling time. Verify your answer.
 - How long would it take for the investment to double if the interest was simple interest?

a) Since its compounded annually
use the rule of 72, $\frac{72}{6} = \boxed{12 \text{ years}}$
($72 \div \text{interest rate}$)

b) $i = prt$
 $t = \frac{i}{(pr)}$

$$t = \frac{40\,000}{(40\,000 \times 0.06)}$$
$$t = \boxed{16.67 \text{ years}}$$

2. Val has \$12 000 and wants it to grow to \$50 000. She has narrowed the possibilities down to the following two investment options:
A. 6% compounded semi-annually B. 5.1% compounded quarterly
Which option should she choose? Why?

```
▪ N=24.14029405  
I%=6  
PV=-12000  
PMT=0  
FV=50000  
P/Y=1  
C/Y=2  
PMT: [END] BEGIN
```

```
▪ N=28.1606865  
I%=5.1  
PV=-12000  
PMT=0  
FV=50000  
P/Y=1  
C/Y=4  
PMT: [END] BEGIN
```

Option A will grow the investment quicker.

3. Warren started investing when he was 5 years old. He deposited \$5 from his allowance at the end of every month into a savings account that earned 5.8%, compounded monthly. He did this until he was 25 years old.
- How much did he invest altogether? What is the current value of his investment at age 25? What is his rate of return?
 - Suppose that he had invested the same total amount in regular equal monthly deposits, but had not started until he was 20. What would the current value of his investment be?
 - Suppose that Warren had wanted his investment to have the same value as in part a) at age 25, but had started investing when he was 20. What would his monthly payments have been?

a)

N=240 ^{-12x20}
 I%=5.8
 PV=-5
 PMT=-5
 FV=2272.145142
 P/Y=12
 C/Y=12
 PMT: END BEGIN

$$\begin{aligned}
 &5 \times 240 \\
 &= 1200 + 5 \\
 &= \underline{\$1205}
 \end{aligned}$$

b)

N=60
 I%=5.8
 PV=-5
 PMT=-5
 FV=353.740445
 P/Y=12
 C/Y=12
 PMT: END BEGIN

c)

N=60
 I%=5.8
 PV=0
 PMT=-32.733972...
 FV=2272.15
 P/Y=12
 C/Y=12
 PMT: END BEGIN

4. Both Alex and Jamie have an investment portfolio.

- a) What is the current value of each portfolio?
- b) Who has the greater rate of return? Explain.

Alex's portfolio:

- A 10-year \$5000 GIC, purchased 9 years ago, that earns 2.6%, compounded annually $\$6299.36$
- A 5-year \$2000 CSB, purchased 4 years ago, that earns 3.1%, compounded semi-annually 2261.88
- A savings account at 1.4%, compounded weekly, into which he has been making weekly deposits of \$15 for 5 years $\$4039.18$

N=9 I%=2.6 PV=-5000 PMT=0 FV=6299.357431 P/Y=1 C/Y=1 PMT: [] BEGIN	N=4 I%=3.1 PV=-2000 PMT=0 FV=2261.879256 P/Y=1 C/Y=2 PMT: [] BEGIN
N=260 I%=1.4 PV=0 PMT=-15 FV=4039.178564 P/Y=52 C/Y=52 PMT: [] BEGIN	

Alex ↗

Jamie's portfolio: ?

- A 10-year \$3000 bond, purchased 9 years ago, that earns simple interest at 2.7% $0.027 (r)$
- A 3-year \$700 CSB, purchased 3 years ago, that earns 2.8%, compounded semi-annually
- A high-interest savings account, at 1.7% compounded monthly, into which she has been making monthly deposits of \$100 for 6 years

- $i = prt$
 $i = (3000)(0.027)(9)$
 $i = 729$
 $FV = i + P$
 $FV = 729 + 3000$
 $FV = 3729$

N=3 I%=2.8 PV=-700 PMT=0 FV=760.8968216 P/Y=1 C/Y=2 PMT: [] BEGIN	N=72 I%=1.7 PV=0 PMT=-100 FV=7574.367645 P/Y=12 C/Y=12 PMT: [] BEGIN
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b) Alex's portfolio has the highest rate of return.

3729
 760.90
 $+ 7574.37$
 $\$12064.27$ ← Jamie