Chapter 6: Simple and compound interest

Simple interest

\[ I = Prn \]

Compound interest

\[ A = P \left(1 + \frac{r}{100}\right)^n \]

where \( P \) is the principal
\( r \) is the interest rate per period expressed as a percentage
\( n \) is the number of periods

Use 1 year = 52 weeks = 365 days.

1. Write as decimals.
   a. 4%
   b. 7.8%
   c. 10.3%
   d. 16%
   e. 20%
   f. 5.12%

2. How many months in:
   a. 4 years?
   b. 9 years?
   c. \( 5 \frac{1}{2} \) years?
   d. \( 2 \frac{1}{2} \) years?

3. Convert these rates to monthly interest rates.
   a. 9% p.a.
   b. 3.9% p.a.
   c. 11.7% p.a.
   d. 16.2% p.a.

4. Convert these rates to daily interest rates, correct to four decimal places.
   a. 17% p.a.
   b. 20.2% p.a.
   c. 8% p.a.
   d. 4.08% p.a.
5 Calculate the simple interest earned from each of the following investments.

a $5600 at 7% p.a. for 3 years

e $10 000 at 12% p.a. for 6 months

b $18 100 at 10.2% p.a. for 5 years

f $4900 at 8.1% p.a. for 100 days

c $7500 at 6.3% p.a. for $2 \frac{1}{2}$ years

g $3200 at 0.48% per month for 1 year

d $26 000 at 9.5% p.a. for 8 months

h $2790 at 0.0603% per day for 55 days

6 What amount must be invested at 5.7% p.a. for 3 years to earn $651.51 in simple interest?

7 Lim's investment of $2100 earned $404.25 in simple interest after $3 \frac{1}{2}$ years. What was the interest rate p.a.?
8 For how long must Kimberly invest $4130 at 3.75% p.a. for it to earn $929.25 in simple interest?

9 Calculate the final amount of each investment accumulating compound interest.
   a $5600 at 7% p.a. for 3 years
   b $18 100 at 10.2% p.a. for 5 years
   c $7500 at 6.3% p.a. compounded half-yearly for $2\frac{1}{2}$ years
   d $26 000 at 9.5% p.a. compounded monthly for 8 months
   e $10 000 at 12% p.a. compounded monthly for 6 months
   f $3200 at 0.48% per month for 1 year

10 $20 000 is invested at 4.75% p.a. compound interest for 3 years. Calculate:
   a the final amount of the investment
   b the total interest earned.
11 $9850 is invested at 0.4167% compound interest per month for 10 months. Calculate:

a. the final amount of the investment

b. the total interest earned.

12 What is the principal that must be invested at compound interest to reach each of the following final amounts? Answer to the nearest cent.

a. $8000 in 4 years at 5% p.a.

b. $14 200 in 3 years at 7.2% p.a.

13 Calculate the compound interest earned when $13 500 is invested at 7% p.a. compounded quarterly for 3 years.

14 By guessing and checking, find how long it will take an investment of $5000 to grow to $8812.85 if the compound interest rate is 6.5% p.a. Answer correct to the nearest year.
### Answers

1. **a** 0.04  
   **b** 0.078  
   **c** 0.103  
   **d** 0.16  
   **e** 0.2  
   **f** 0.0512

2. **a** 48 months  
   **b** 108 months  
   **c** 66 months  
   **d** 30 months

3. **a** 0.75%  
   **b** 0.325%  
   **c** 0.975%  
   **d** 1.35%

4. **a** 0.0466%  
   **b** 0.0553%  
   **c** 0.0219%  
   **d** 0.0112%

5. **a** $1176  
   **b** $9231  
   **c** $1181.25  
   **d** $1646.67

6. **a** $3810  
7. **5.5%**

8. **6 years**

9. **a** $6860.24  
   **b** $29416.20  
   **c** $8758.05  
   **d** $27693.02  
   **e** $10615.20  
   **f** $3389.26

10. **a** $22987.52  
     **b** $2987.52  

11. **a** $10268.23  
     **b** $418.23  

12. **a** $6581.62  
     **b** $11526.67

13. **$3124.43**

14. **9 years**