Worksheet

EXAMPLE

R30 000 is invested at 6% p.a. compounded monthly for a period of n years.
The investment matures to R44 266,40. For how many years was the money invested?

Step 1: Fill in the known amounts into the formula for compound interest:

$$A = P(1 + i)^n$$
$$R44\ 266,40 = 30\ 000\left(1 + \frac{0,06}{12}\right)^{12n}$$

Step 2: Divide both sides by 30 000:

$$\frac{44\ 266,40}{30\ 000} = \left(1 + \frac{0,06}{12}\right)^{12n}$$

Step 3: Take logs both sides to solve for n:

$$\log\left(\frac{44\ 266,40}{30\ 000}\right) = \log\left(1 + \frac{0,06}{12}\right)^{12n}$$

Step 4: Use the power log law:

$$\log\left(\frac{44\ 266,40}{30\ 000}\right) = 12n \times \log\left(1 + \frac{0,06}{12}\right)$$

Step 5: Isolate the unknown term:

$$\frac{\log\left(\frac{44\ 266,40}{30\ 000}\right)}{\log\left(1 + \frac{0,06}{12}\right)} = 12n$$

Step 6: Calculate the value of $12n$ (months):

$$12n = 78$$
$$n = 6,5 \text{ years}$$

Exercise 1

1. Julius invests R10 000 in a savings account. The bank offers him 9,6% p.a. interest compounded monthly. In how many years will his money double?

2. An amount of R15 700 is invested at 12% compound interest. After how many years will the investment be worth R230 000?

3. Adam invests R30 000 at 6% p.a. compounded monthly. In how many years will he have made R12 000 interest?

4. A company purchased a motorcycle for R10 000. The vehicle depreciates @ 25% p.a. on the reducing balance. After how many years and months will the motorcycle be worth half the original price?

5. If Joe invests R750 at the end of each month in an account that earns 11,4% p.a. compounded monthly, after how many years will his investment be worth R1 000 000?
   (Write the answer to the nearest year.)