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Simple and compound interest

Simple interest

$$I = \frac{Prn}{100}$$

Compound interest

$$A = P\left(1 + \frac{r}{100}\right)^n \qquad \textbf{(final amount)}$$

$$I = A - P \qquad \textbf{(interest)}$$

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

  e $600

  f $108.74

  g $184.32

  h $92.53

6 $3810

7 5.5%

8 6 years

9 a $6860.24

  b $29 416.20

  c $8758.05

  d $27 693.02

  e $10 615.20

  f $3389.26

10 a $22 987.52

  b $2987.52

11 a $10 268.23

  b $418.23

12 a $6581.62

  b $11 526.67

13 $3124.43

14 9 years