

8.1 Simple Interest

A Ratios and Decimals

A ratio is a division of two numbers.

A ratio may be converted into a decimal and viceversa.

$$\frac{2}{3} = 2 \div 3$$

Example 1. Convert each ratio into a decimal.

a) $\frac{3}{2} = 1.5$
 $= 1.50$

b) $\frac{4}{3} = 1.333\dots$

≈ 1.33
 (two decimal places)

c) $\frac{5}{4} = 1.25$

a) $\frac{6}{3} = 2 = 2.00$

Example 2. Convert each decimal into a ratio.

a) 0.2
 $= \frac{2}{10} = \frac{1}{5}$

b) 0.3
 $= \frac{3}{10}$

c) 0.12
 $= \frac{12}{100}$
 $= \frac{3}{25}$

a) 0.45
 $= \frac{45}{100}$
 $= \frac{9}{20}$

use a calculator

B Decimals and Percentage

A decimal may converted into a Percentage.

Example 3. Convert each decimal into a percentage.

a) 0.04
 $= \frac{4}{100}$
 $= 4 \cdot \frac{1}{100} = 4\%$

b) 0.25
 $= \frac{25}{100}$
 $= 25\%$

c) 0.17
 $= \frac{17}{100}$
 $= 17 \cdot \frac{1}{100} = 17\%$

d) 0.054
 $= 5.4\%$
 move two places to the right

! $\% = \frac{1}{100}$

Example 4. Convert each ratio into a percentage.

a) $\frac{3}{2}$
 $= 1.5000\dots$
 $= 150\%$

b) $\frac{4}{5}$
 $= 0.80$
 $= 80\%$

c) $\frac{5}{4}$
 $= 1.25$
 $= 125\%$

d) $\frac{6}{4}$
 $= 1.5$
 $= 150\%$

Example 5. Convert each percentage into a ratio.

a) 4%
 $= 4 \cdot \frac{1}{100}$
 $= \frac{4}{100}$
 $= \frac{1}{25}$

b) 23%
 $= \frac{23}{100}$

c) 1.7%
 $= \frac{1.7}{100} = \frac{17}{1000}$

a) 54%
 $= \frac{54}{100}$
 $= \frac{27}{50}$

$\% = \frac{1}{100}$

! $\% = \text{per cent} = \frac{1}{100}$

C Simple Interest

→ given as a percentage

Simple interest I , is proportional to the principal (initial amount) P , the interest rate r , and period of time t .

Simple Interest $I = Prt$

I → Simple Interest
 P → Principal
 r → interest rate
 t → time

5 years, or months, or days

Example 6. Find the simple interest accumulated over 5 years for an investment of \$10,000 at 5% interest rate per year.

$t = 5$ years
 $P = \$10,000$
 $r = 5\%$

$I = ?$
 $I = P \cdot r \cdot t$
 $= (\$10,000) (5\%) (5 \text{ years})$
 $= (10,000) \left(\frac{5}{100}\right) (5) = 2500$

∴ The simple interest is \$2,500.

Example 7. Find the simple interest accumulated over 4 months for an investment of \$1,200 at 2.5% interest rate per year.

$t = 4 \text{ months} = \frac{1}{3} \text{ year}$
 $P = \$1,200$
 $r = 2.5\% = \frac{2.5}{100}$

$I = Prt$
 $= (1200) \left(\frac{2.5}{100}\right) \left(\frac{1}{3}\right)$
 $= 10$

∴ $I = \$10 = \10.00

Example 8. How many years are necessary for an investment of \$2000 at 2% interest per year to accumulate a simple interest of %500?

D Amount

Amount (final or future value of an investment) is the sum between the principal and the simple interest.

$$A = P + I$$

Example 9. Find the simple interest and the future value accumulated over 10 years for an investment of \$5,000 at 4% interest rate per year.

Note. The amount (final or future value of an investment) may be also calculated by using the following formula:

$$A = P(1 + rt)$$

Example 10. Find the future value accumulated over 8 years for an investment of \$15,000 at 1% interest rate per year.

Example 11. How much money should be invested now at 2.5% simple interest such that in 2 years the future value to be \$3000?

Example 12. For how many years, an initial amount of money of \$6000 invested at 4% per year simple interest such that the future value of this investment become \$8,000?