

UNIT 3 *Using Fractions and Percentages* Introduction to SIM

Learning objectives

This unit extends the earlier work on *fractions* and *percentages*. After completing this unit of STUDENT INSTRUCTIONAL MATERIAL (SIM) you should

- understand how to add, subtract, multiply and divide fractions
- be able to use fractions in contexts
- understand the concept of compound interest and be able to calculate the value of a sum of money invested for a given number of years
- be able to solve reverse percentage problems in context.

Key points and principles

- Use the lowest common multiple (LCM) of the denominator when adding or subtracting fractions
- Multiply fractions by multiplying the numerators and the denominators.
For example, $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$
- Divide fractions using the fact that dividing by a number is the same as multiplying by the reciprocal of that number.
For example, $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$
- The value of a sum of money invested in an account paying compound interest at the rate of $r\%$ each year is found by multiplying the initial value by $\left(1 + \frac{r}{100}\right)$.
- Reverse percentage problems can be solved using the equation

$$\text{price} = \text{original cost} \times \left(1 + \frac{r}{100}\right)$$

where r is value added rate (e.g. $r = 16\frac{1}{2}\%$ GCT), giving

$$\text{original cost} = \frac{\text{price}}{\left(1 + \frac{r}{100}\right)}$$

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Facts to remember

- $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$
- $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$
- Value of investment, A , is given by $A_n = A_0 \left(1 + \frac{r}{100}\right)^n$ after n years at $r\%$ interest added yearly and A_0 is the original value invested.

Glossary of terms

Adding, subtracting, multiplying and dividing fractions

Compound interest: when the interest each year is added to the value of the account

Depreciation: the rate at which the value of a commodity (e.g. boat, car) decreases over time

Reverse percentage problems in which you find the original value given the percentage increase/decrease and the current value after the increase/decrease.