# Year 12
# Maths
# Standard 2

# Lesson 7
# Rates 1

MATRIX
EDUCATION

# 1. Introduction to Rates

## ☐ Rates

- A rate is a measurement used to compare two quantities that are measured in **different** units.
- Rates are written in the form where the first amount represents one unit of the second amount.

$$first\ unit/second\ unit$$

- As such, the order is important when interpreting rates. E.g.
  - \$12/kg means "\$12 per kilo"
  - 80 heart beats/min means "80 heart beats per minute"
  - \$1.40AUD/\$USD means "\$1.40 AUD per USD"
- Rates can all be written as fractions

  Examples of rates:
  - 60 metres in 15 seconds is a rate of $\frac{60\ m}{15\ s} = 4\ m/s$
  - 250 mL every 4 hours is a rate of $\frac{250\ mL}{4\ h} = 62\frac{1}{2}\ mL/h$
- We can find a desired value by multiplying what we want by the rate.
  - E.g. Find the cost of 3kg of meat at \$12/kg.
    Cost = \$12/kg × 3kg = \$36

## Concept Check 1.1

Convert the following into a rate

(a) [1] $15\ cm/5minutes$

$\_\_\_\_\_ /1minute$

(b) [2] $1.49m/12minutes$

$\_\_\_\_\_ /1minute$

(c) [3] $70kg/2weeks$

$\_\_\_\_\_ /1week$

(d) [4] $\$160000\ /1year$

$\_\_\_\_\_ /1day$

(e) [5] $540\ runs/100overs$

$\_\_\_\_\_ /1over$

(f) [6] $10MB/1week$

$\_\_\_\_\_ /1day$

## Concept Check 1.2

Complete the following:

(a) A temperature rise of 18°C in $2\frac{1}{4}$ hours is a rate of _____ $°C/hour$ [7]

(b) Ethan swam 100 metres in 90 seconds. This is a rate of _____ $m/s$ [8]

(c) Jennifer typed 5000 words in 45 minutes. Her typing rate is _____ $words/min$ [9]

(d) A box of 36 apples cost $5.40. This is a rate of _____ $cents/apple$ [10]

(e) Australia needed 360 runs in 75 overs to win the match.

This is a rate of _____ $runs/over$ [11]