

24. [Units of Measurement / Time]

Skill 24.1 Converting units of time (1).

MM4.2 1 2 2 3 3 4 4
MM5.1 1 1 2 2 3 3 4 4

Conversion Facts - TIME

$$\begin{aligned}
 1 \text{ week} &= 7 \text{ days} = 168 \text{ h} = 10\,080 \text{ min} = 604\,800 \text{ s} \\
 1 \text{ day} &= 24 \text{ h} = 1\,440 \text{ min} = 86\,400 \text{ s} \\
 1 \text{ h} &= 60 \text{ min} = 3\,600 \text{ s} \\
 1 \text{ min} &= 60 \text{ s}
 \end{aligned}$$

To change from **smaller** units to **larger** units:

- Divide by the conversion factor (because you need less).

Example: To change s to min \div by 60

To change from **larger** units to **smaller** units:

- Multiply by the conversion factor (because you need more).

Example: To change h to min \times by 60

Q. 4 min 40 s = s

A. $4 \text{ min } 40 \text{ s} = 4 \times 60 \text{ s} + 40 \text{ s}$ min to s: $\times 60$
 $= 240 \text{ s} + 40 \text{ s}$
 $= \mathbf{280 \text{ s}}$

a) 600 seconds = minutes

s to min: $\div 60$

$600 \text{ s} = 600 \div 60 \text{ min} = 10 \text{ min}$

b) 5 hours = minutes

h to min: $\times 60$

c) 4 minutes = seconds

d) 180 s = min

e) 10 h = min

f) 240 min = h

g) 300 min = h

h) 5 min = s

i) 4 days = h

j) 4 weeks = days

Skill 24.1 Converting units of time (2).

MM4.2 1 1 2 2 3 3 4 4
MM5.1 1 1 2 2 3 3 4 4

k) 10 years = months

.....

l) 5 days = h

.....

m) 90 min = h

.....

n) 270 min = h

.....

o) 3 h 35 min = min

.....

p) 5 min 30 s = s

.....

q) 3 weeks, 5 days = days

.....

r) 2 h 50 min = min

.....

s) 2 min 25 s = s

.....

t) 6 h 10 min = min

.....

u) $2\frac{1}{3}$ days = h

$2 \times 24 + \frac{1}{3} \times 24 = 48 + 8 = 56$

.....

v) $1\frac{1}{4}$ h = min

.....

w) $\frac{3}{4}$ day = h

.....

x) $2\frac{1}{2}$ h = min

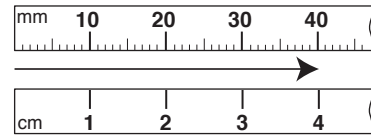
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Conversion Facts - LENGTH

$$1 \text{ km} = 1000 \text{ m} = 100\,000 \text{ cm} = 1\,000\,000 \text{ mm}$$

$$1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$$

$$= 1 \text{ cm} = 10 \text{ mm}$$



To change from **smaller** units to **larger** units:

- Divide by the conversion factor (because you need less).

Example: To change
mm to cm
÷ by 10

To change from **larger** units to **smaller** units:

- Multiply by the conversion factor (because you need more).

Example: To change
cm to mm
× by 10

Q. $3800 \text{ cm} = \boxed{} \text{ m}$

A. $3800 \text{ cm} = 3800 \div 100 \text{ m}$ *cm to m: ÷ 100*
 $= 38 \text{ m}$

a) $24 \text{ cm} = \boxed{240} \text{ mm}$
cm to mm: × 10

$24 \times 10 = 240$

b) $120 \text{ mm} = \boxed{} \text{ cm}$
mm to cm: ÷ 10

c) $130 \text{ cm} = \boxed{} \text{ mm}$

d) $8 \text{ km} = \boxed{} \text{ m}$

e) $7000 \text{ m} = \boxed{} \text{ km}$

f) $6 \text{ m} = \boxed{} \text{ cm}$

g) $19 \text{ m} = \boxed{} \text{ mm}$

h) $50 \text{ mm} = \boxed{} \text{ cm}$

i) $12 \text{ km} = \boxed{} \text{ m}$

j) $11\,000 \text{ m} = \boxed{} \text{ km}$

Skill 24.2 Converting units of length (2).

MM4.2 1 1 2 2 3 3 4 4
MM5.1 1 1 2 2 3 3 4 4

k) 15 m = mm

.....

l) 16 m = cm

.....

m) 7000 m = km

.....

n) 4000 cm = m

.....

o) 140 m = cm

.....

p) 19 cm = mm

.....

q) 270 cm = m

.....

r) 30 m = cm

.....

s) 500 mm = m

.....

t) 4.1 km = m

.....

u) 2.8 m = mm

.....

v) 600 m = km

.....

w) 0.2 km = m

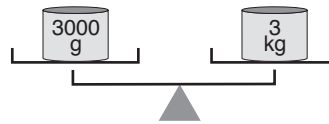
.....

x) 3.7 m = mm

.....

Conversion Facts - MASS

1 tonne = 1000 kg = 1 000 000 g
1 kg = 1000 g



To change from **smaller** units to **larger** units:

- Divide by the conversion factor (because you need less).

Example: To change g to kg \div by 1000

To change from **larger** units to **smaller** units:

- Multiply by the conversion factor (because you need more).

Example: To change tonnes (t) to kg \times by 1000

Q. 2.5 kg = g

A. $2.5 \text{ kg} = 2.5 \times 1000 \text{ g}$ *kg to g: \times 1000*
 $= 2.500$ *3 zeros, 3 places to the right*
 $= 2500 \text{ g}$

a) $6 \text{ t} =$ kg *t to kg: \times 1000*
3 zeros, 3 places to the right
 $6 \times 1000 = 6000$

b) $9000 \text{ g} =$ kg *g to kg: \div 1000*

c) $2000 \text{ kg} =$ tonnes

d) $3.4 \text{ kg} =$ g

e) $5000 \text{ g} =$ kg

f) $70000 \text{ g} =$ kg

g) $8 \text{ tonnes} =$ kg

h) $1.9 \text{ kg} =$ g

i) $20000 \text{ g} =$ kg

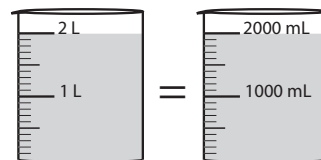
j) $10000 \text{ kg} =$ t

Conversion Facts - CAPACITY

1 ML (megalitre) = 1 000 kL = 1 000 000 L

1 kL = 1000 L

1 L = 1000 mL (millilitre)



To change from **smaller** units to **larger** units:

- Divide by the conversion factor (because you need less).

Example: To change mL to L \div by 1000

To change from **larger** units to **smaller** units:

- Multiply by the conversion factor (because you need more).

Example: To change kL to L \times by 1000

Q. 7500 mL = L

A. $7500 \text{ mL} = 7500 \div 1000 \text{ L}$ *mL to L: \div 1000*
 $= \overbrace{7500}^{\text{3 zeros, 3 places to the left}}.0$
 $= 7.5 \text{ L}$

a) 3.7 L = mL
L to mL: \times 1000
 $3.7 \times 1000 = 3700$

b) 6 L = mL
L to mL: \times 1000

c) 22 L = mL

d) 8000 mL = L

e) 40 L = mL

f) 9.4 L = mL

g) 0.5 L = mL

h) 1.2 L = mL

i) 30000 mL = L

j) 15.3 L = mL

k) 200 mL = L

l) 500 mL = L

Skill 24.5 Converting units of time, length, mass and capacity by using real-life facts.

MM4.2 1 1 2 2 3 3 4 4
MM5.1 1 1 2 2 3 3 4 4

- Use the conversion factors to convert the units of time, length, mass and capacity. (see skills 24.1 to 24.4, pages 227 to 232)

Q. The ruby throated hummingbird can beat its wings at a rate of 4200 beats per minute. Is this more or less than 200 000 beats per hour?

A. 4200 beats in a minute
 $1\text{ h} = 60\text{ min}$
 $\Rightarrow 4200 \times 60\text{ min} = 252\,000\text{ beats in an hour}$
 $252\,000 > 200\,000$
 \Rightarrow The answer is **more**.

a) The longest river in the world is the Nile (North-East Africa). It is 6655 km long. Express this in metres.

km to m: $\times 1000$

$$6655 \times 1000\text{ m} = 6\,655\,000\text{ m}$$

m

b) While brushing your teeth, a running tap wastes 5 litres of water. Express this in millilitres.

mL

c) The average weight of an adult blue whale is 120 tonnes. Express this in kilograms.

kg

d) Bamboo can grow up to 1 metre in a day. How many centimetres is this?

cm

e) The first athlete to run a mile in under four minutes was Australian distance champion John Landy, who ran it in 3 minutes and 58 seconds. Express this in seconds.

s

f) The newborns' average respiratory rate is 45 breaths per minute. Is this more than or less than 3000 breaths per hour?

g) An astronaut weighs 12 kg on the moon. Express this weight in grams.

g

h) Our bodies lose on average 2.5 litres of water a day. Express this in millilitres.

mL

i) The average weight of an elephant at birth is about 105 kilograms. Express this in grams.

g

j) Your heart pumps about 6000 mL of blood every minute. How many litres will it pump in a day?

L

Skill 24.6 Finding the elapsed time between two events.

MM4.2 11 22 33 44
MM5.1 11 22 33 44

- Calculate the time until the next closest hour.
am to pm
- Add the time to midday.
- Then add the remaining time.

- **pm to am**
- Add the time to midnight.
- Then add the remaining time.

Q. School starts at 8:50 am and ends at 2:30 pm. How long is a school day in hours and minutes?

A. $8:50$ to $9:00 = 10$ min
 $9:00$ to $12:00 = 3$ h
 $12:00$ to $2:30 = 2$ h 30 min
 10 min + 3 h + 2 h + 30 min
 = **5 h 40 min**

a) Find the time in hours and minutes between 8:30 am and 3:00 pm the same day.

$8:30$ to $9:00 = 30$ min, $9:00$ to $12:00 = 3$ h

$12:00$ to $3:00 = 3$ h

30 min + 3 h + 3 h \Rightarrow

b) The movie begins at 3:15 pm and ends at 5:00 pm. How long is the movie in hours and minutes?

\Rightarrow

c) Mum started cooking at 6:20 pm and finished at 7:35 pm. How long did she cook in hours and minutes?

\Rightarrow

d) Find the time in hours and minutes between 6:30 pm and 2:10 am the next day.

\Rightarrow

e) Find the time in hours and minutes between 4:00 am and 2:25 pm on the same day.

\Rightarrow

f) Find the time in hours and minutes between 09:10 and 16:20 on the same day.

\Rightarrow

To calculate the time ahead

- Add the time difference to the given time (count forward on the clock).

To calculate the time behind

- Subtract the time difference from the given time (count backward on the clock).

To calculate the time difference

- Subtract the two given times.

Q. A Virgin Australia flight departs Gold Coast at 12:05 pm and arrives in Auckland the same day at 5:30 pm. If Auckland time is 2 hours ahead Gold Coast time how long was the flight?

A. Gold Coast departure time = 12:05 pm
 (Auckland time = 12:05 plus 2 h = 2:05 pm)
 Auckland arrival time = 5:30 pm
 Flight time (using Auckland time) =
 2:05 pm to 5:30 pm
 = **3 h 25 min**

a) It is 10:15 pm in Tokyo. If London time is 9 hours behind Tokyo time, what time is it in London?

[Give your answer using 12-hour time.]

subtract the time difference

London time = 10:15 pm less 9 h

⇒

b) You live in Melbourne and want to call Grandma in Wellington, at noon, on Christmas day, Wellington time. If Wellington time is 2 h ahead Melbourne time, at what time should you call?

[Give your answer using 12-hour time.]

⇒

c) Roger is in Rotorua and wants to ring Alina in Los Angeles (LA) at midnight on New Year, LA time. If LA time is 21 hours behind Rotorua time, at what time in Rotorua should he call?

[Give your answer using 12-hour time.]

⇒

d) Sven is in Auckland and wants to ring Oscar in Paris at 10:00 am Paris time. If Paris time is 12 h behind Auckland time, at what time in Auckland should he call? [Give your answer using 12-hour time.]

⇒

e) A Qantas flight departs Sydney on Friday at 5:40 pm and arrives in Singapore on Friday at 10:30 pm. If Singapore time is 3 hours behind Sydney time, how long is the flight?

[Give your answer using 12-hour time.]

⇒

f) It is Sunday, 1825 hours in Shanghai, China, and Sunday, 2325 hours in Wellington. By how many hours is Shanghai time behind Wellington time?

⇒

