# 24. [Units of Measurement / Time]

continues on page 214



## Skill 24.1 Converting units of time (1).

- Use these conversion factors for units of time.

| | | | | |
|---|---|---|---|---|
| 1 week = | **7** days = | **168** h = | **10 080** min = | **604 800** s |
| | 1 day = | **24** h = | **1440** min = | **86 400** s |
| | | 1 h = | **60** min = | **3600** s |
| | | | **1** min = | **60** s |

To change from **smaller** units to **larger** units
- Divide by the conversion factor (because you need less).

Example: To change s to min ÷ 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 × by 60

**Q.** 4 min 40 s = ☐ s

**A.** *4 min 40 s* = 4 × 60 *s* + 40 *s* (min to s: × 60)
= 240 *s* + 40 *s*
= ***280 s***

**a)** 600 seconds = ☐ minutes (s to min: ÷ 60)

*600 s = 600 ÷ 60 min = 10 min*

**b)** 5 hours = ☐ minutes (h to min: × 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

continued from page 213

## Skill 24.1 Converting units of time (2).



**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 = 56 h

*day to h: × 24*

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

**v)** $1\frac{1}{4}$ h = ☐ min

**w)** $\frac{3}{4}$ day = ☐ h

**x)** $2\frac{1}{2}$ h = ☐ min

continues on page 216

## Skill 24.2 Converting units of length (1).

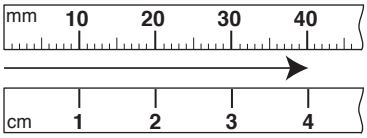


- Use these conversion factors for metric units of length.

| | | | | |
|---|---|---|---|---|
| 1 km = | **1000** m | = **100 000** cm | = | **1 000 000** mm |
| 1 m = | | **100** cm | = | **1000** mm |
| | | 1 cm | = | **10** 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 cm = ☐ m

**A.** *3800 cm = 3800 ÷ 100 m* (cm to m: ÷ 100)
*= **38 m***

**a)** 24 cm = 240 mm

(cm to mm: × 10)

*24 × 10 = 240*

**b)** 120 mm = ☐ cm

(mm to cm: ÷ 10)

**c)** 130 cm = ☐ mm

**d)** 8 km = ☐ m

**e)** 7000 m = ☐ km

**f)** 6 m = ☐ cm

**g)** 19 m = ☐ mm

**h)** 50 mm = ☐ cm

**i)** 12 km = ☐ m

**j)** 11 000 m = ☐ km

continued from page 215

## Skill 24.2 Converting units of length (2).



**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

.....

## Skill 24.3 Converting units of mass.

- Use these conversion factors for metric units of 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 ÷ 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 × by 1000

**Q.** 2.5 kg = ☐ g

**A.** *2.5 kg = 2.5 × 1000 g* (kg to g: × 1000)
*= 2.500* (3 zeros, 3 places to the right)
***= 2500 g***

**a)** 6 t = ☐ kg (t to kg: × 1000)

(3 zeros, 3 places to the right)

*6 × 1000 = 6000*

**b)** 9000 g = ☐ kg (g to kg: ÷ 1000)

**c)** 2000 kg = ☐ tonnes

**d)** 3.4 kg = ☐ g

**e)** 5000 g = ☐ kg

**f)** 70 000 g = ☐ kg

**g)** 8 tonnes = ☐ kg

**h)** 1.9 kg = ☐ g

**i)** 20 000 g = ☐ kg

**j)** 10 000 kg = ☐ t

## Skill 24.4 Converting units of capacity.

- Use these conversion factors for metric units of capacity.

1 kL = **1000** L = **1 000 000** mL
1 L = **1000** mL or 1000 cm$^3$

To change from **smaller** units to **larger** units
- Divide by the conversion factor (because you need less).

Example: To change mL to L ÷ 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 × by 1000

**Q.** 7500 mL = ☐ L

**A.** *7500 mL = 7500 ÷ 1000 L* (mL to L: ÷ 1000)
*= 7500.0* (3 zeros, 3 places to the left)
***= 7.5 L***

**a)** 3.7 L = ☐ mL (L to mL: × 1000)

*3.7 × 1000 = 3700*

**b)** 6 L = ☐ mL (L to mL: × 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)** 30 000 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.



- Use the conversion factors to convert the units of time, length, mass and capacity.
(see skills 24.1 to 24.4, pages 213 to 218)

**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 h = 60 min*
$\Rightarrow$ *4200 × 60 min = 252 000 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: × 1000*

*6655 × 1000 m = 6 655 000 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.



- 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* ⇒ ☐

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

⇒ ☐

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

⇒ ☐

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

⇒ ☐

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

⇒ ☐

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

⇒ ☐

## Skill 24.7 Using time zones to calculate durations.



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 Blue flight departs Gold Coast at 12:05 pm and arrives in Perth the same day at 5:05 pm. If Perth time is 2 hours behind Gold Coast time how long was the flight?

**A.** *Gold Coast departure time = 12:05 pm*
*(Perth time = 12:05 less 2 h = 10:05 am*
*Perth arrival time = 5:05 pm*
*Flight time (using Perth time) =*
*10:05 am to 5:05 pm*
*= **7 h***

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

*subtract the time difference*

*London time = 10:15 pm less 9 h*

..... ⇒ .....

**b)** You live in Canberra and want to call Grandma in Darwin, at noon, on Christmas day, Darwin time. If Darwin time is 1.5 h behind Canberra time, at what time should you call?

..... ⇒ .....

**c)** Roger is in Brisbane and wants to ring Alina in Los Angeles at midnight on New Year, LA time. If Los Angeles time is 17 hours behind Brisbane time, at what time in Brisbane should he call?

..... ⇒ .....

**d)** Sven is in Melbourne and wants to ring Oscar in London at 9:00 am London time. If London time is 11 h behind Melbourne time, at what time in Melbourne should he call?

..... ⇒ .....

**e)** It is Sunday, 1825 hours in Shanghai, China, and Sunday, 2125 hours in Sydney. By how many hours is Shanghai time behind Sydney time?

..... ⇒ .....

**f)** 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?

..... ⇒ h min