

## Modern Math Modules

### Module 7

# Measurement in Real-Life

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Alexis lives in Toronto. She made a long distance phone call to her sister in Winnipeg, Manitoba at 8:50p.m. EST. What time was it in Winnipeg?

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## PART 1

### Time

Mrs. Brady visits her grandchildren for 6 weeks during the summer. How many days does she visit her grandchildren?

<b>60 seconds (s)</b>	<b>=</b>	<b>1 minute (min)</b>
<b>60 minutes</b>	<b>=</b>	<b>1 hour (h)</b>
<b>24 hours</b>	<b>=</b>	<b>1 day (d)</b>
<b>7 days</b>	<b>=</b>	<b>1 week (wk)</b>
<b>365 days</b>	<b>=</b>	<b>1 year (y)</b>
<b>12 months (mo)</b>	<b>=</b>	<b>1 year</b>
<b>52 weeks</b>	<b>=</b>	<b>1 year</b>
<b>100 years</b>	<b>=</b>	<b>1 century (c)</b>

To change from weeks to days, multiply.

$$6 \text{ weeks} = ? \text{ days}$$

$$1 \text{ week} = 7 \text{ days}$$

$$6 \times 7 = 42$$

$$6 \text{ weeks} = 42 \text{ days}$$

Mrs. Brady's visit lasted for 42 days.

*Example:* How many hours is 150 minutes?

$$150 \text{ minute} = ? \text{ hours}$$

$$60 \text{ minutes} = 1 \text{ hour}$$

$$150 \div 60 = 2.5$$

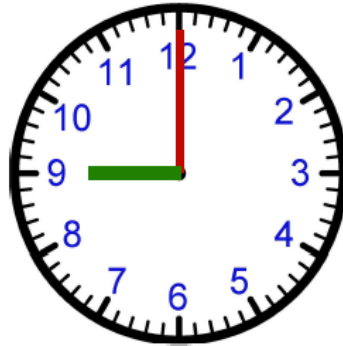
$$150 \text{ minutes} = 2.5 \text{ hours}$$



2 hours 30 minutes
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## Analog Clocks

Most devices we use are digital and tell us what the time is. Sometimes you might need to read an analog clock. Analog clocks use hands to show the time.



Step 1: Look at the number on the clock face. Clocks are numbered from 1-12.

Step 2: Look at the shorter hand. This tells you the hour. In this example, the shorter hand is pointing to the 9 which means that the time is somewhere between 9:00 and 9:59.

Step 3: Look at the longer hand, which tells you the minutes. Each of the 12 numbers on the clock face divides a 60-minute hour into 5-minute intervals. Beginning at 12, count 5 minutes for every time the long hand has passed a bigger number:

- 12 = :00
- 1 = :05
- 2 = :10
- 3 = :15
- 4 = :20
- 5 = :25
- 6 = :30
- 7 = :35
- 8 = :40
- 9 = :45
- 10 = :50
- 11 = :55

Step 4: Use the longer hand to find the individual minutes between the numbers. Most clock faces have 4 markers between each number. Each marker is for an additional minute. So if the longer hand points between 12 and 1, at the third marker, then the minute is :03. If the clock doesn't have markers, you need to estimate where the marker is pointing. For example, if it is halfway between 12 and 1, you would guess :03.

Step 5: Read the time. In the example clock, the shorter hand is pointing at the 9 and the longer had is pointing at the 12. The time is 9:00.

**Part 1: Time**  
**Practice Your Skills**

**Exercise 1-A**  
**Complete.**

1.  $2 \text{ h} = \underline{\hspace{2cm}} \text{ min}$

2.  $2 \text{ d} = \underline{\hspace{2cm}} \text{ h}$

3.  $4 \text{ min} = \underline{\hspace{2cm}} \text{ s}$

4.  $12 \text{ h} = \underline{\hspace{2cm}} \text{ min}$

5.  $300 \text{ s} = \underline{\hspace{2cm}} \text{ min}$

6.  $1 \text{ h} = \underline{\hspace{2cm}} \text{ s}$

7.  $6 \text{ min} = \underline{\hspace{2cm}} \text{ s}$

8.  $1 \text{ d} = \underline{\hspace{2cm}} \text{ min}$

9.  $210 \text{ min} = \underline{\hspace{2cm}} \text{ h}$

10.  $1 \text{ d} = \underline{\hspace{2cm}} \text{ s}$

11.  $\underline{\hspace{2cm}} \text{ min} = 900 \text{ s}$

12.  $\underline{\hspace{2cm}} \text{ wk} = 168 \text{ h}$

13.  $\underline{\hspace{2cm}} \text{ h} = 2 \text{ d}$

14.  $280 \text{ d} = \underline{\hspace{2cm}} \text{ wk}$

15.  $\underline{\hspace{2cm}} \text{ min} = 720 \text{ s}$

16.  $5 \text{ d} = \underline{\hspace{2cm}} \text{ h}$

17.  $\underline{\hspace{2cm}} \text{ y} = 730 \text{ d}$

18.  $10 \text{ y} = \underline{\hspace{2cm}} \text{ mo}$

19.  $\underline{\hspace{2cm}} \text{ mo} = 2.5 \text{ y}$

20.  $35 \text{ d} = \underline{\hspace{2cm}} \text{ wk}$

21.  $360 \text{ min} = \underline{\hspace{2cm}} \text{ h}$

22.  $\underline{\hspace{2cm}} \text{ wk} = 5 \text{ y}$

23.  $\underline{\hspace{2cm}} \text{ y} = 2 \text{ c}$

24.  $96 \text{ mo} = \underline{\hspace{2cm}} \text{ y}$

25.  $4 \text{ c} = \underline{\hspace{2cm}} \text{ y}$

26.  $84 \text{ d} = \underline{\hspace{2cm}} \text{ wk}$

27.  $4 \text{ y} = \underline{\hspace{2cm}} \text{ mo}$

**Real-Life Math**

**Exercise 1-B**  
**Solve.**

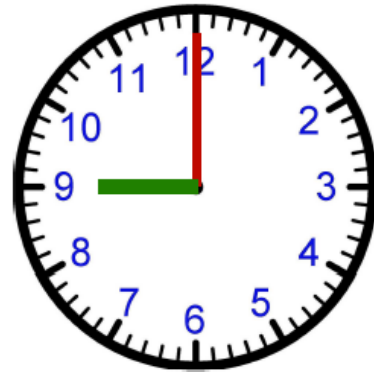
28. Walter spends 3 weeks in Mexico. How many days is that?

29. Diana watched a movie that was 1 hour 55 minutes. How many minutes was the movie?

30. The airline flight lasted 3 hours. How many seconds was the flight?

31. Mary called her daughter-in-law on Saturday. The call lasted 39 minutes. How many seconds did the call last?

32. Write the time for each clock.



## PART 2

### Adding and Subtracting Time

Janice works part-time as a cashier. She worked 5 h 15 min on Monday and 3 h 55 min on Wednesday. What is the total time she worked?

To find out, add.

Step 1 Add the minutes. Regroup.

$$\begin{array}{r} 5^{\text{h}} 15 \text{ min} \\ + 3^{\text{h}} 55 \text{ min} \\ \hline 70 \text{ min} \\ 10 \text{ min} \end{array}$$

← 60 min = 1 h so  
70 min = 1 h 10 min

Step 2 Add the hours.

$$\begin{array}{r} 5^{\text{h}} 15 \text{ min} \\ + 3^{\text{h}} 55 \text{ min} \\ \hline 9^{\text{h}} 10 \text{ min} \end{array}$$

Janice worked 9 h 10 min.

*Example:* It took Tim 17 minutes 14 seconds to complete a typing test. It took Maddie 14 minutes 39 seconds to complete the same test. How much longer did it take Tim to finish the test?

To find out, subtract.

$$\begin{array}{r} 17^{\text{min}} 14^{\text{s}} \\ - 14^{\text{min}} 39^{\text{s}} \\ \hline 35^{\text{s}} \end{array}$$

← 1 min = 60 s  
60 + 14 = 74 s

$$\begin{array}{r} 17^{\text{min}} 14^{\text{s}} \\ - 14^{\text{min}} 39^{\text{s}} \\ \hline 2^{\text{min}} 35^{\text{s}} \end{array}$$

← Subtract the minutes.

It took Tim 2 min 35 s longer to complete the test.

## Part 2: Adding and Subtracting Time

### Practice Your Skills

#### Exercise 2-A

Add.

1. 
$$\begin{array}{r} 2 \text{ hours } 4 \text{ minutes} \\ + 3 \text{ hours } 15 \text{ minutes} \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 16 \text{ minutes } 32 \text{ seconds} \\ + 4 \text{ minutes } 38 \text{ seconds} \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 19 \text{ hours } 55 \text{ minutes} \\ + 2 \text{ hours } 17 \text{ minutes} \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 23 \text{ minutes } 14 \text{ seconds} \\ + 10 \text{ minutes } 52 \text{ seconds} \\ \hline \end{array}$$

#### Exercise 2-B

Subtract.

5. 
$$\begin{array}{r} 6 \text{ hours } 35 \text{ minutes} \\ - 2 \text{ hours } 10 \text{ minutes} \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 10 \text{ minutes } 5 \text{ seconds} \\ - 3 \text{ minutes } 46 \text{ seconds} \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 32 \text{ minutes } 10 \text{ seconds} \\ - 10 \text{ minutes } 39 \text{ seconds} \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 11 \text{ hours } 14 \text{ minutes} \\ - 8 \text{ hours } 22 \text{ minutes} \\ \hline \end{array}$$

### Real-Life Math

#### Exercise 2-C

Solve.

9. Raymond cooks his special chili for 2 hours 45 minutes. Max cooks his chili 30 minutes longer than Raymond cooks his. How long does Max cook his chili?

10. The drive from Kelley's house to her daughter's house took 3 hours 10 minutes during rush hour traffic. It normally takes 2 hours 15 minutes. How much longer does the drive take during rush hour.



## PART 3

### Elapsed Time

Emily arrived at the meeting at 9:45 A.M. The meeting lasted until 12:15 P.M.  
How long did the meeting last?

To find out, subtract.

12:15 P.M.	➡	<del>12</del> <sup>11</sup> hours <del>15</del> <sup>75</sup> minutes
9:45 A.M.	➡	<u>+ 9 hours 45 minutes</u>
		2 hours 30 minutes

The meeting lasted for 2 hours 30 minutes.

*Example:* Wayne left for the airport at 6:30 P.M. It took 1 hour 10 minutes to get to the airport by car. What time did Wayne get to the airport?

#### Mental Math

You can solve this problem mentally.

Think: 6:30 P.M. to 7:30 P.M. is 1 hour.

7:30 P.M. and 10 minutes is 7:40 P.M.

Wayne arrived at the airport at 7:40 P.M.

*Example:* It takes Martin 2 hours 30 minutes to cook and eat dinner. He starts at 5:30p.m. Then he rides his bicycle for 1 hour 15 minutes before he gets ready for bed. What time does Martin get ready for bed?

5:30p.m. → 5 hours 30 minutes  
+2 hours 30 minutes  
 8 hours 0 minutes ← 8:00 P.M.

Think: 8:00 P.M. to 9:00 P.M. is 1 hour.

9:00 P.M. and 15 minutes is 9:15 P.M.

Martin gets ready for bed at 9:15 P.M.

### **Part 3: Elapsed Time**

#### **Practice Your Skills**

#### **Exercise 3-A**

**Solve.**

1. Brian starts work at 8:45 A.M. He wakes up at 6:30 A.M. How much time does Brian have to get dressed and get to work?
2. Rose wants to watch a late night talk show on TV. It starts at 12:35 A.M. and ends at 1:15 A.M. How long is the show?
3. Krista gets home from work at 7:30 P.M. She relaxes for 55 minutes before she goes to yoga class. What time does she leave for class?
4. Carol put a turkey in the oven at 9:25 A.M. The turkey cooked for 5 hours. What time did she take the turkey out of the oven?
5. Richard left Toronto International Airport at 9:55 P.M. His flight to Winnipeg Manitoba took 2 hours 10 minutes. What time did he arrive in Winnipeg?
6. Justin began his shift at 10:35 P.M. He worked for 7 hours. What time did Justin get off work?
7. Eleanor begins her lunch hour at 11:45 A.M. She leaves work at 4:45 P.M. How long is it between the start of lunch and the end of the work day?

## PART 4

# Metric Units of Length

In Canada we use the metric system, which is the major system of measurement used in most of the world. The United States is one exception. They use the customary or imperial system of measurement in most everyday situations.

The metric system is a base-ten system of measurement. The most commonly used units of length are the centimetre (cm), the metre (m) and the kilometre (km). The base unit for length in the metric system is the metre.

1 millimetre = 0.001 metre

1 centimetre = 0.01 metre

1 decimetre = 0.1 metre

1 dekametre = 10 metres

1 hectometre = 100 metres

1 kilometre = 1,000 metres

We use centimetres to measure small objects.

We use kilometres to measure long distances.

*Example:* Which is the better unit to measure:

- |                      |            |
|----------------------|------------|
| a. width of a room?  | metre      |
| b. distance to work? | kilometre  |
| c. length of fabric? | metre      |
| d. an index finger?  | centimetre |

### Mental Math

You can compare units of length mentally.

Which is greater, 15 cm or 1 m?

Think: 1 m = 100 cm

So, 15 cm is less than 1 m.

*Example:* Brittany jogged 6 kilometres in 1 hour. How many metres is that?

To change a larger unit to a smaller unit, multiply.

$$6 \text{ km} = ? \text{ m}$$

$$1 \text{ km} = 1,000 \text{ m}$$

$$6 \times 1,000 = 6,000$$

$$6 \text{ km} = 6,000 \text{ m}$$

Brittany jogged 6,000 m.

*Example:* Danny measures the window in his living room for new curtains. The window is 170 cm wide. How many metres wide is the window?

To change a smaller unit to a larger unit, divide.

$$100 \text{ cm} = ? \text{ m}$$

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

$$170 \div 100 = 1.70$$

$$170 \text{ cm} = 1.7 \text{ m}$$

The window is 1.7 m wide.

*Example:* Mary has a piece of fabric that is 4 m 5 cm. long. How many centimetres long is the fabric?

$$4 \text{ m } 5 \text{ cm} = ? \text{ cm}$$

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

$$4 \times 100 = 400$$

$$400 + 5 = 405$$

$$4 \text{ m } 5 \text{ cm} = 405 \text{ cm}$$

The fabric is 405 cm long.

## PART 4

### Metric Units of Length

#### Exercise 4-A

Choose the better unit to measure each of the following.

1. distance around your hips      a. km      b. m      c. cm
2. width of a notebook      a. m      b. km      c. cm
3. distance to the airport      a. cm      b. km      c. m
4. height of a building      a. m      b. km      c. cm
5. length of a football field      a. cm      b. m      c. km

#### Exercise 4-B

#### Complete

6. 3000 cm = \_\_\_\_ m      7. 60 m = \_\_\_\_ cm      8. 108 cm = \_\_\_\_ m
9. 10,500 m = \_\_\_\_ km      10. 300 m = \_\_\_\_ cm      11. 27 m = \_\_\_\_ cm
12. 72 cm = \_\_\_\_ m      13. \_\_\_\_ cm = 4 m      14. \_\_\_\_ m = 144 cm
15. 252 cm = \_\_\_\_ mm      16. \_\_\_\_ m = 180 cm      17. 60 cm = \_\_\_\_ m
18. 84 cm = \_\_\_\_ mm      19. \_\_\_\_ m = 1 km      20. 3 km = \_\_\_\_ m
21. 2 m 4 cm = \_\_\_\_ cm      22. 16 m = \_\_\_\_ cm
23. 5 m 8 cm = \_\_\_\_ cm      24. 2,000 m = \_\_\_\_ km
25. 9 m 2 cm = \_\_\_\_ cm      26. 7 m 8 cm = \_\_\_\_ mm

## PART 5

# Metric Units of Weight and Capacity

The most commonly used units of weight are the gram (g), the kilogram (kg) and the ton (t). To measure weight the base unit is the gram (g).

$$1 \text{ milligram} = 0.0001 \text{ gram}$$

$$1 \text{ centigram} = 0.01 \text{ gram}$$

$$1 \text{ decigram} = 0.1 \text{ gram}$$

$$1 \text{ dekagram} = 10 \text{ grams}$$

$$1 \text{ hectogram} = 100 \text{ grams}$$

$$1 \text{ kilogram} = 1,000 \text{ grams}$$

$$1 \text{ ton} = 1,000 \text{ kilograms}$$

We use grams to measure light objects.

We use kilograms and tons to measure heavy objects.

*Example:* Which is the better unit to measure:

- a. a horse?                      kg
- b. a kitten?                      g
- c. an onion?                      g
- d. a moving truck?              t

*Example:* Roger buys 2 kg of green peppers at the grocery store. How many grams is that?

To change from a larger unit to a smaller unit, multiply.

$$2 \text{ kg} = ? \text{ g}$$

$$1 \text{ kg} = 1,000 \text{ g}$$

$$2 \times 1,000 = 2,000$$

$$2 \text{ kg} = 2,000 \text{ g}$$

Roger buys 2,000 grams of green peppers.

*Example:* 80 g = ? kg

To change from a smaller unit to a larger unit, divide.

$$80 \text{ g} = ? \text{ kg}$$

$$1,000 \text{ g} = 1 \text{ kg}$$

$$80 \div 1,000 = 0.08$$

$$80 \text{ g} = 0.08 \text{ kg}$$

To measure capacity we usually use metric units such as the millilitre (ml), the litre (l) and the kilolitre (kl). The base unit for capacity is the litre.

$$1 \text{ millilitre} = 0.001 \text{ litre}$$

$$1 \text{ centilitre} = 0.01 \text{ litre}$$

$$1 \text{ decilitre} = 0.1 \text{ litre}$$

$$1 \text{ dekalitre} = 10 \text{ litres}$$

$$1 \text{ hectolitre} = 100 \text{ litres}$$

$$1 \text{ kilolitre} = 1,000 \text{ litres}$$

We use millilitres to measure small quantities of liquids. We use litres and kilolitres to measure large quantities of liquids.

Sometimes when we measure capacity, especially in recipes, we need to understand the customary units such as the fluid ounce (fl oz), the cup (c), the pint (pt), the quart (qt), and the gallon (gal).

$$8 \text{ fluid ounces} = 1 \text{ cup}$$

$$2 \text{ cups} = 1 \text{ pint}$$

$$2 \text{ pints} = 1 \text{ quart}$$

$$4 \text{ quarts} = 1 \text{ gallon}$$

We use cups to measure small quantities of liquids.

We use gallons to measure larger quantities of liquids.

*Example:* Which is the better unit to measure:

- a. paint?                      l
- b. motor oil?                 ml
- c. water in a bathtub?      l
- d. a juice glass?             ml

*Example:* Ashley buys 1.5 litres of apple cider. How many millilitres is that?

To change from a larger unit to a smaller unit, multiply.

$$1.5 \text{ l} = ? \text{ ml}$$

$$1 \text{ l} = 1,000 \text{ ml}$$

$$1.5 \times 1,000 = 1,500$$

$$1.5 \text{ l} = 1,500 \text{ ml}$$

Ashley buys 1.500 ml of apple cider.

*Example:* 16 kl = ? l

To change from a smaller unit to a larger unit, divide.

$$16 \text{ kl} = ? \text{ l}$$

$$1 \text{ kl} = 1,000 \text{ l}$$

$$16 \div 1,000 = 0.016$$

$$16 \text{ kl} = 0.016 \text{ l}$$



## **PART 5**

### **Exercise 5-A**

**Complete using metric measures.**

1. Mel weighs about 89 \_\_\_\_\_.
2. A small carton of juice holds about 1 \_\_\_\_\_.
3. An envelope weight about 3 \_\_\_\_\_.
4. A washing machine holds about 190 \_\_\_\_\_ of water.
5. Jan used about 8 \_\_\_\_\_ of paint in the living room.
6. The average weight of an African elephant is 7 \_\_\_\_\_.

## PART 6

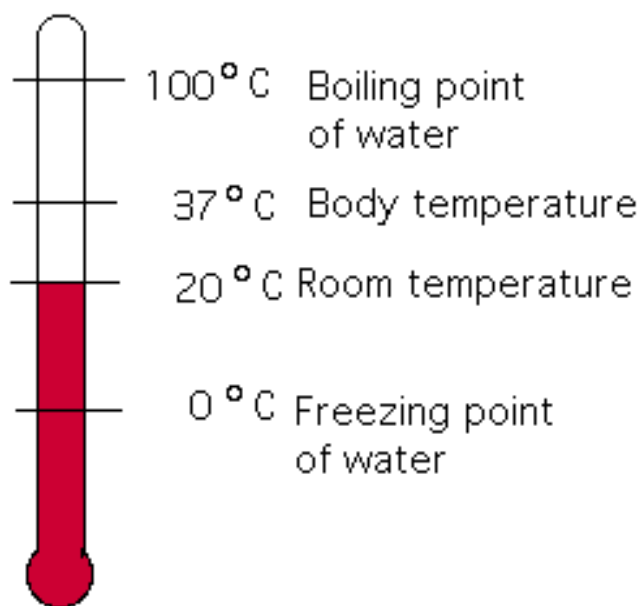
# Temperature

The Celsius ( $^{\circ}\text{C}$ ) temperature scale is used for measuring temperature in the metric system. The two points of reference for this scale are the boiling point of water and the freezing point of water.

$0^{\circ}\text{C}$  is the freezing point for water

$100^{\circ}\text{C}$  is the boiling point for water

The Celsius scale has an interval from freezing to boiling that is a power of 10 ( $100 = 10^2$ ). The thermometer below has the freezing point and the boiling point as well as some common temperatures.



Look at the thermometer.

The temperature of Pat's tea is  $54^{\circ}\text{C}$  below the temperature of boiling water.  
What is the temperature of the tea?

To find the difference, subtract  $54^{\circ}\text{C}$  from  $100^{\circ}\text{C}$ .

$$\begin{array}{r} 100 \\ - 54 \\ \hline 46 \end{array}$$

Pat's tea is  $46^{\circ}\text{C}$ .

*Example:* The outside temperature on Saturday was  $13^{\circ}\text{C}$  below the normal body temperature of a human. What was the temperature?

To find out, look at the thermometer.

Subtract  $13^{\circ}\text{C}$  from  $37^{\circ}\text{C}$ .

$$\begin{array}{r} 37 \\ - 13 \\ \hline 24 \end{array}$$

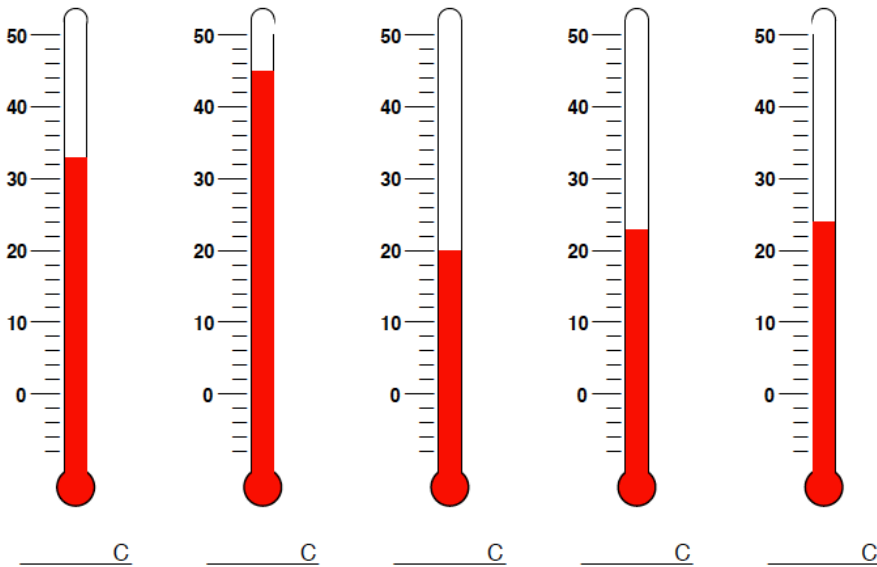
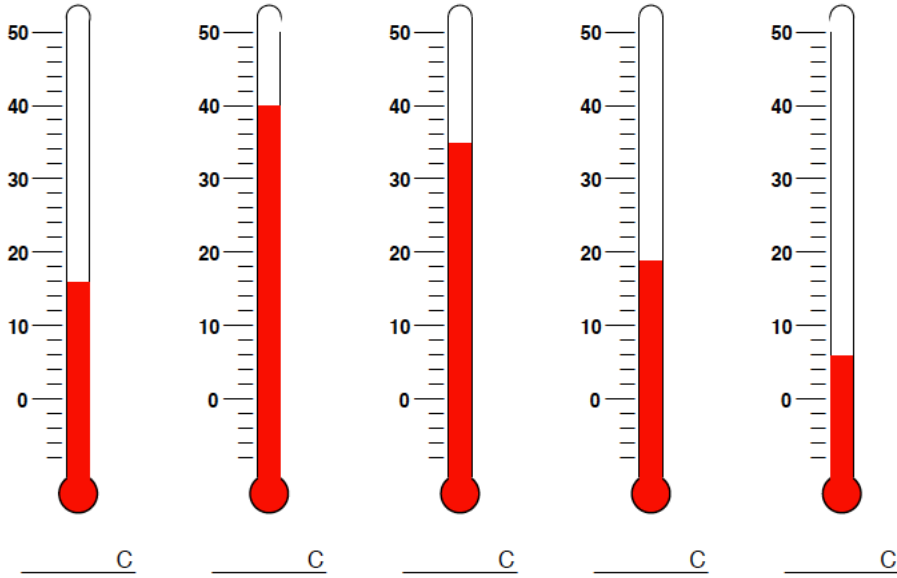
It was  $24^{\circ}\text{C}$  on Saturday.

**PART 6**

**Exercise 6-A**

**Write the temperature.**

**Find the temperature for each thermometer.**



**Exercise 6-B****Choose the most reasonable temperature.**

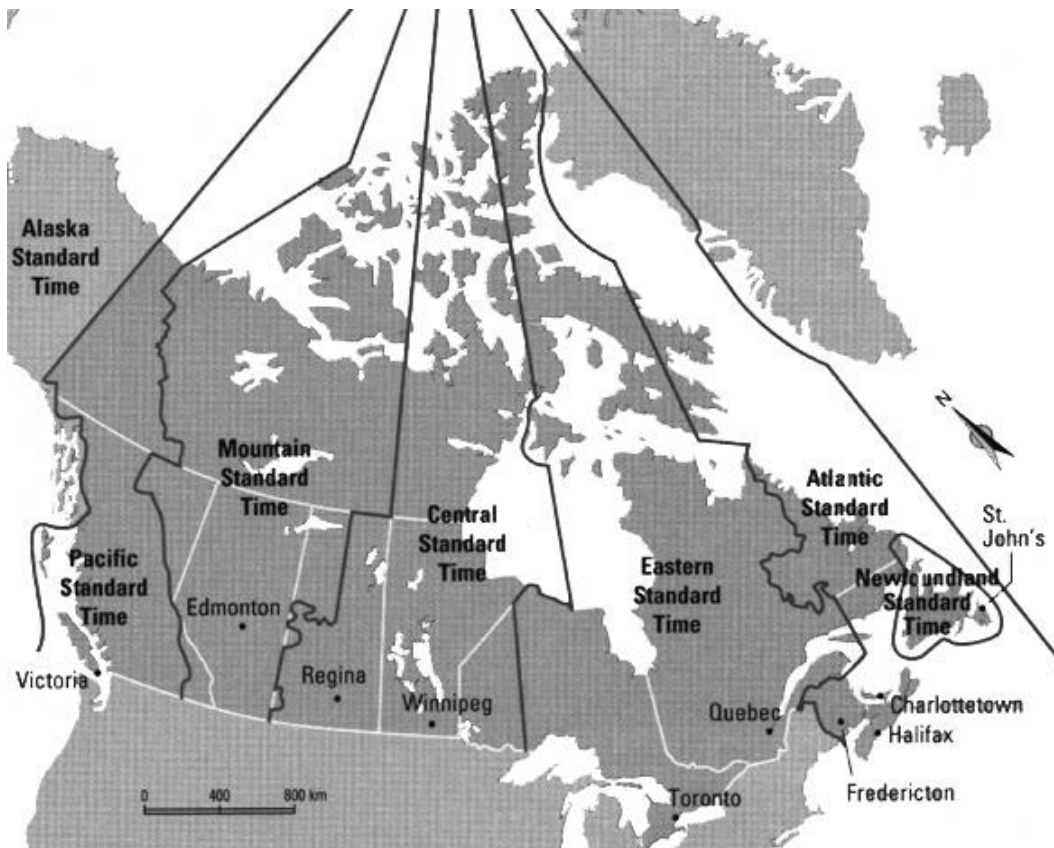
- |                     |                         |                          |                          |
|---------------------|-------------------------|--------------------------|--------------------------|
| 7. hot soup         | a. $30^{\circ}\text{C}$ | b. $85^{\circ}\text{C}$  | c. $110^{\circ}\text{C}$ |
| 8. a summer day     | a. $85^{\circ}\text{C}$ | b. $-10^{\circ}\text{C}$ | c. $45^{\circ}\text{C}$  |
| 9. an autumn day    | a. $92^{\circ}\text{C}$ | b. $61^{\circ}\text{C}$  | c. $25^{\circ}\text{C}$  |
| 10. baking potatoes | a. $40^{\circ}\text{C}$ | b. $240^{\circ}\text{C}$ | c. $90^{\circ}\text{C}$  |
| 11. ice cubes       | a. $40^{\circ}\text{C}$ | b. $-5^{\circ}\text{C}$  | c. $400^{\circ}\text{C}$ |

## Real-Life Math

### Module #7 Task-based Activity: Time Zones

A time zone is a geographic region where the same standard time is used. There are six time zones in the Canada. From east to west they are Newfoundland Time Zone, Atlantic Time Zone, Eastern Standard Time Zone (EST), Central Standard Time Zone (CST), Mountain Standard Time Zone (MST), and Pacific Standard Time Zone (PST). As you move from west to east the time increases by one hour in each time zone except Newfoundland, which only increases 30 minutes.

Pacific Time	Mountain Time	Central Time	Eastern Time	Atlantic Time	Newfoundland
10:53 AM	11:35 AM	12:35 AM	1:35 PM	2:35 PM	3:05 PM



When it is 6:00 p.m. in Toronto, what time is it in each city?

1. Victoria \_\_\_\_\_
2. Halifax \_\_\_\_\_
3. St John's \_\_\_\_\_
4. Winnipeg \_\_\_\_\_
5. Edmonton \_\_\_\_\_
6. Quebec City \_\_\_\_\_
7. Charlottetown \_\_\_\_\_

A newscast is being shown live from Regina at 11:00 p.m. What time is it being seen in each city?

8. Toronto \_\_\_\_\_
9. Fredericton \_\_\_\_\_
10. St John's \_\_\_\_\_

## Module 7: Measurement in Real Life

### Review

Complete.

1. \_\_\_\_\_ s = 7 min      2. 192 h = \_\_\_\_\_ d      3. 156 wk = \_\_\_\_\_ y

4. 6 d = \_\_\_\_\_ h      5. 1 d = \_\_\_\_\_ min      6. 540 min = \_\_\_\_\_ h

7. 48 cm = \_\_\_\_\_ m      8. \_\_\_\_\_ m = 1 km      9. 3 km = \_\_\_\_\_ m

10. \_\_\_\_\_ cm = 1 m      11. 12 cm = \_\_\_\_\_ mm      12. \_\_\_\_\_ cm = 8 m

Add or subtract.

13.    6 hours 12 minutes  
    + 3 hours 15 minutes

14.    13 hours 40 minutes  
    + 3 hours 50 minutes

15.    8 minutes 31 seconds  
    - 3 minutes 45 seconds

16.    10 hours 5 minutes  
    - 8 hours 33 minutes

### Real Life Math

Solve.

26. Katie gets up at 6:45 a.m. She has to leave for work at 9:00a.m. How long does she have to get ready for work?