CHAPTER 5

1

Using Measurements to Describe Objects

Goal **Use logical reasoning to choose measurements.**

You will need a ruler marked in millimetres.

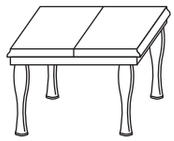
Fill in the blanks with the correct measurements.

1. Anna's kitchen table seats ___6___ people.

It is ___90___ cm wide, ___1.5___ m long,

and ___750___ mm high.

1.5 750 6 90



At-Home Help

Measurements can be used to describe objects. To solve measurement problems, use the clues given and your own knowledge.

1 cm = 10 mm
100 cm = 1 m
1000 mm = 1 m

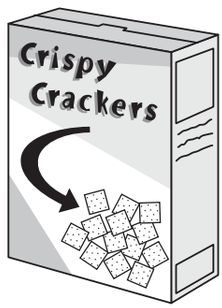
2. Tilo can cycle ___10___ km in one hour. The library is 5 km from his home. It will take Tilo about ___30___ min to cycle from home to the library. The speed limit for cars on city streets is ___50___ km/h.

This is ___5___ times Tilo's speed.

5 10 50 30

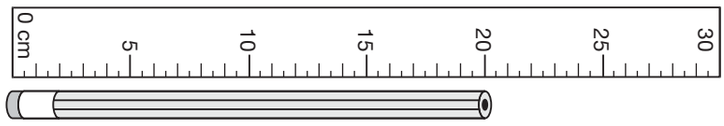
3. A box of crackers is ___0.18___ m high, ___6___ cm deep, and ___140___ mm wide. The box holds about ___70___ crackers.

0.18 70 140 6



4. A new pencil is ___0.2___ m long and ___7___ mm wide.

The eraser is ___0.5___ cm long.



0.2 0.5 7

CHAPTER 5

2 Measuring Lengths

Goal **Relate metric units of length to each other.**

You will need a ruler marked in millimetres.

1. Describe how you can use a 30 cm ruler to measure ribbon for each length.

a) 0.3 m Since 0.3 m = 30 cm, use ruler once.

b) 105 cm Use ruler three times to get 90 cm, then add another 15 cm to get 105 cm.

c) 750 mm Use ruler twice to get 60 cm, then add another 15 cm to get 75 cm or 750 mm.

At-Home Help

When measuring objects, you may have to use tools that are available rather than ideal. You can use a 30 cm ruler to measure many lengths.

1 m = 100 cm
1 m = 1000 mm
1 cm = 10 mm

2. Describe how to cut a piece of fabric 0.9 m long using a 30 cm ruler.

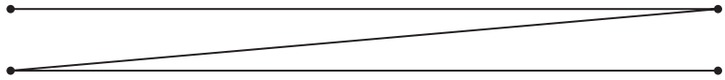
Use ruler three times to get 90 cm or 0.9 m.

3. Draw each length.

a) 112 mm

b) a 0.3 m zigzag path

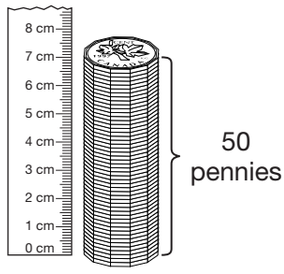
Suggested answer:



4. How can you calculate the thickness of one penny in millimetres? Use the information in the picture.

Height of 50 pennies is 7 cm or 70 mm. So to find thickness of 1 penny, divide height of 50 pennies by the number of pennies.

70 mm ÷ 50 = 1.4 mm Each penny is 1.4 mm thick.



5. Two adjacent houses on a street are 1300 cm apart.

a) Do you think the houses are in a rural or an urban area? Explain.

Houses are in an urban area because 1300 cm or 13 m is not a great distance.

b) What would be a better unit for describing the distance? Why?

Metres would be a better unit because it is easier to write and visualize 13 m than 1300 cm.

CHAPTER 5

3

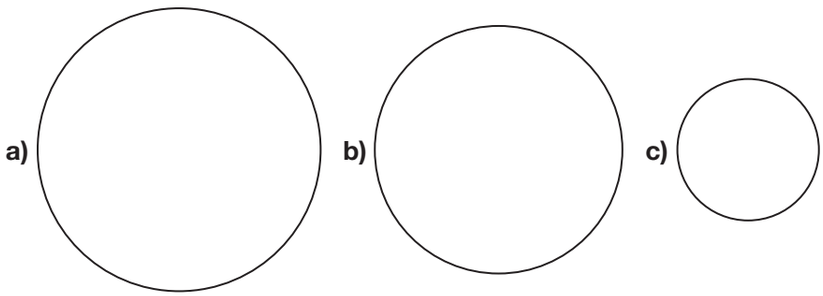
Measuring Circumference

Goal **Measure around circular objects.**

You will need a ruler marked in millimetres, and a tape measure.

1. Measure and record the width and circumference of each circle in centimetres. Complete the table.

a) b) c)

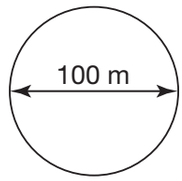


Circle	Width	Circumference
a)	4 cm	about 12.6 cm
b)	3.5 cm	about 11.0 cm
c)	2 cm	about 6.3 cm

2. For each circle, is the circumference closer to two times, three times, or four times the width?

three times

3. Liam is practicing for a 400 m race. If he runs around a circular track with a width of 100 m, will he run as far as the race distance? Explain.



No, because three times 100 m is 300 m, which is less than 400 m.

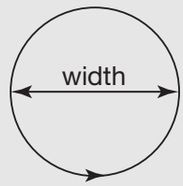
4. The hula hoops in the gym are 96 cm in width. What is the best estimate of their circumference?

3 m 270 cm 4000 mm

3 m

At-Home Help

Circumference is the distance around a circle or circular object.



Circles have a particular relationship between width and circumference.

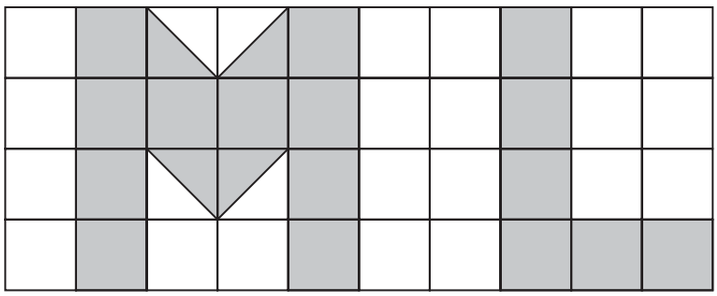
CHAPTER 5

4 Measuring Perimeter

Goal **Measure perimeter on a grid.**

You will need a metric ruler.

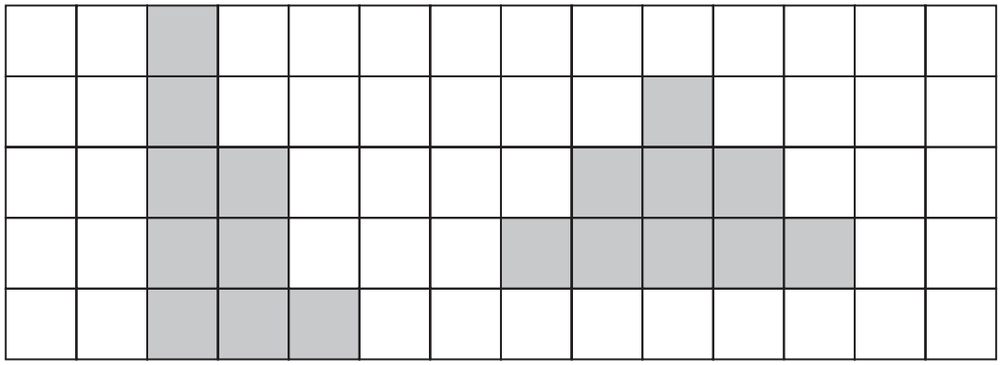
1. The initials for the Maple Leafs are shaded on the grid below. Estimate the perimeter. Check by measuring.



	Estimated perimeter	Actual perimeter
M	20 cm	21.2 cm
L	10 cm	14 cm
total	30 cm	35.2 cm

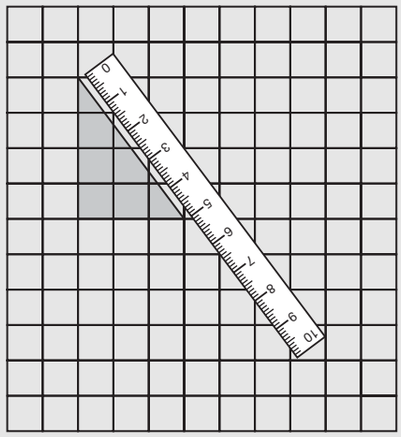
2. Use the grid to draw two different shapes each with a perimeter of 16 cm. Each shape must have more than 4 sides.

Suggested answer:



At-Home Help

Perimeter is the distance around an object. Using grid paper helps you measure the perimeter of irregular shapes. When the sides of shapes do not follow grid lines, use a ruler to measure the lengths accurately.



Perimeter is an outside measurement.

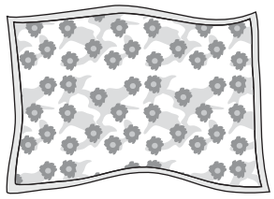
CHAPTER 5

5 Measuring the Perimeter of a Rectangle

Goal **Develop and use a rule for calculating the perimeter of a rectangle.**

1. Calculate the length of trim you would need to go around these blankets.

a)



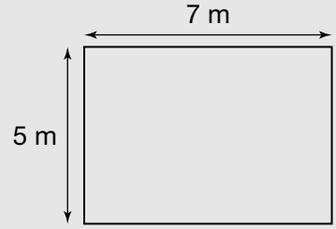
2 m + 3 m + 2 m + 3 m = 10 m or 2(2 m + 3 m) = 10 m

b)

90 cm + 140 cm + 90 cm + 140 cm = 460 cm
or 2(90 cm + 140 cm) = 460 cm

At-Home Help

In a rectangle, opposite sides are the same length. The perimeter of a rectangle can be calculated by adding the length and width, and then doubling the sum.



For example:

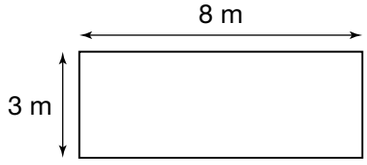
perimeter of this rectangle
= two times (5 m + 7 m)
= two times (12 m)
= 24 m

2. Which rectangle has the greater perimeter? How much greater is it?

a) 7.5 cm by 6 cm **b)** 7 cm by 7 cm

Rectangle b) has the greater perimeter. It is 1 cm greater than a).

3. **a)** How will the perimeter of this rectangle change if you add 4 m to the width?



The perimeter will increase by 8 m.

b) How will the perimeter change if you divide the length in half?

The perimeter will decrease by 8 m.

4. To calculate the perimeter of a square, Sue multiplies the width by 4. Is her rule correct? Explain.

Yes. All the side lengths of a square are equal. Since perimeter is the distance around an object, multiplying the side length of a square by 4 gives the correct perimeter.

CHAPTER 5

6 Solve Problems Using Tables

Goal **Use tables to solve distance problems.**

1. Tom cycles 150 m in one minute. He multiplies this by 10 then makes a table of his distances and times.

Distance (m)	Time (min)
1500	10
3000	20
4500	30
6000	40
7500	50
9000	60

Complete the table to estimate how long it will take Tom to cycle 8 km.

It will take Tom about 53 minutes to cycle 8 km.

At-Home Help

Organizing data in tables helps you see patterns. Using tables is an effective problem-solving strategy.

For example, as the distance increases by 1000 m, the time increases by 10 minutes.

Distance (m)	Time (min)
1000	10
2000	20
3000	30

2. Rosa can paddle her kayak at the rate of 1 km every 5 minutes. At this rate how far will she paddle in 1 hour? Make a table to help you.

Distance (km)	Time (min)
1	5
2	10
3	15
4	20
5	25
6	30
7	35
8	40
9	45
10	50
11	55
12	60

12 km

3. Tamara skates 120 m in one minute. Emma skates 1 km in 10 minutes. Create 2 tables to find out which girl can skate farther in 30 minutes. How much farther?

Suggested answer:

Tamara

Distance (m)	Time (min)
120	1
240	2
360	3
480	4
600	5
720	6
840	7
960	8
1080	9
1200	10

Emma

Distance (m)	Time (min)
1000	10

In 30 minutes, Tamara can skate 600 m farther.

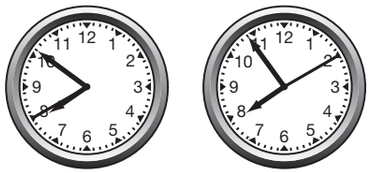
CHAPTER 5

7 Measuring Time

Goal **Estimate and measure time to the nearest second.**

1. Juanita is making popcorn. Estimate and then calculate the time it took to make the popcorn.

start finish

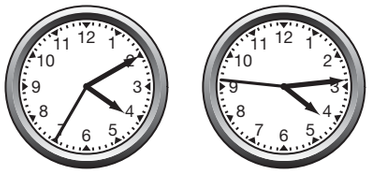


I estimate the time to be Suggested answer: 3 min.

I calculate the time to be 2 min 30 s.

2. Kevin wonders how long the songs on the radio are. He noted the start and end times of one song. Estimate and then calculate the time.

start finish



I estimate the time to be Suggested answer: 4 min.

I calculate the time to be 4 min 11 s.

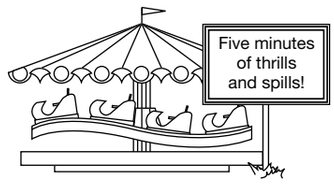
At-Home Help

This clock shows when the traffic light turned red.

This clock shows when the traffic light turned green.

The traffic light was red for 1 min 43 s. From 8:47:29 to 8:48:00 is 31 s. From 8:48:00 to 8:49:00 is 1 min. From 8:49:00 to 8:49:12 is 12 s. So the total time was 1 min 43 s.

3. A ride at the amusement park has a sign saying: "Five minutes of thrills and spills!"



Yoshi noted the start time of 11:55:26 and the finish time of 12:00:12. Was the sign accurate? Explain.

The actual time on the ride is a little less than 5 min (4 min 46 s). Since signs usually do not list times in seconds and the ride is almost 5 min, the sign is accurate.

4. The school bell rings at 9:00:00. How much time is left before the bell?

9 min 27 s

CHAPTER 5

8 Recording Dates and Times

Goal **Write dates and times using numeric format.**

1. Colin's flight home landed on March 25, 2004, at 23 minutes 12 seconds after eight o'clock in the evening.

Record the date and time in numeric format.

2004-03-25 20:23:12

2. Colin departed three weeks before his return home at five minutes after noon.

Record his departure time in numeric format.

2004-03-04 12:05:00

3. Write each birth date and time in numeric format.

a) July 18, 1999 at 3 minutes 15 seconds after midnight

1999-07-18 00:03:15

b) November 20, 2001 at 4 seconds after six thirty in the evening

2001-11-20 18:30:04

4. The Internet Café charges $0.50 for each minute or part of a minute. How much should Sofie pay if she logs on at 16:48:33 and logs off at 17:00:26? Show your work.

16:48:33 to 17:00:26 is almost 12 min
$0.50 x 12 = $6.00

At-Home Help

When dates are recorded in numeric format, the year is recorded first, then a hyphen, then the month (using two digits), then another hyphen, then the day (using two digits).

For example, March 10, 2004 would be written as 2004-03-10.

The times on flight, train, and ship schedules are recorded using a 24 hour clock. The hour is written first, followed by a colon, then the minute(s), also followed by a colon, then the seconds (all numbers must have two digits).

On a 24 hour clock, noon is written as 12:00:00. On digital clocks, midnight is displayed as 00:00:00. All hours are written according to the number of hours after midnight.

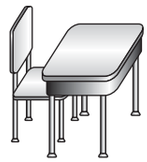
For example, 1 p.m. is written as 13:00:00.

CHAPTER 5

Test Yourself

Circle the correct answer.

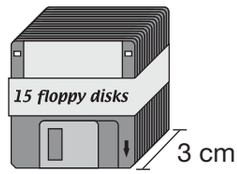
1. A student desk is about _____ m high. It measures about _____ mm across and about _____ cm from front to back. What are the measurements?



A. 0.8, 650, 410 **B.** 80, 650, 41

C. 0.8, 65, 41 **D.** 0.8, 650, 41

2. What is the thickness of 1 floppy disk in mm? Use the information in the picture to help you.



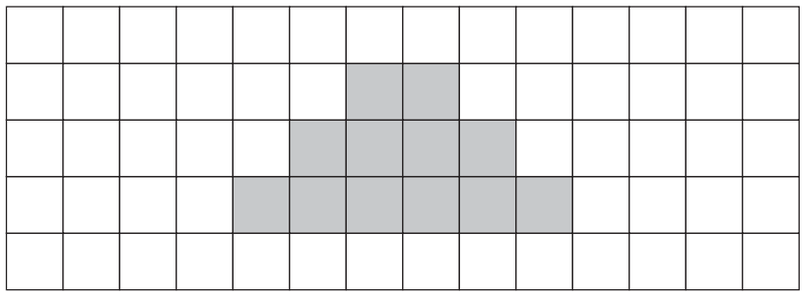
A. 2 **B.** 30

C. 3 **D.** 20

3. The width of Adam's bicycle wheel is 0.6 m. What is the best estimate of the circumference of the wheel?

A. 60 cm **B.** 1.2 m **C.** 2.5 m **D.** 190 cm

4. What is the perimeter of this shape?



A. 14 cm **B.** 18 cm **C.** 12 cm **D.** 20 cm

5. A 7.5 cm by 6 cm photo is enlarged. The new length and the width are doubled. What is the perimeter of the new photo?

A. 7.5 cm greater **B.** double the original perimeter

C. 12 cm greater **D.** 1.5 times the original perimeter

CHAPTER 5

Test Yourself Page 2

6. Fiona rides her skateboard about 150 m in 1 minute. She made a table to track her distance and time. About how long will it take her to skateboard 4 km?

Distance (m)	Time (min)
1500	10
3000	20

A. 20 minutes

B. 23 minutes

C. 27 minutes

D. 30 minutes

7. Neil wants to synchronize the clocks in his home. When the radio announced it was exactly noon, three clocks in his home looked like this:

How must Neil correct the time on each clock?

A. (i) back 23 seconds, (ii) ahead 1 minute 44 seconds, (iii) back 2 minutes

B. (i) back 37 seconds, (ii) ahead 1 minute 44 seconds, (iii) back 2 minutes

C. (i) back 37 seconds, (ii) ahead 1 minute 16 seconds, (iii) back 2 minutes

D. (i) ahead 37 seconds, (ii) ahead 2 minutes 44 seconds, (iii) back 2 minutes

8. A hot air balloon will be launched at 40 minutes 30 seconds after 3 p.m. on Canada Day (July 1), 2007. How would the date and time of the launch be written in numeric format?

A. 2007-01-07 3:40:30

B. 2007-01-07 03:40:30

C. 2007-07-01 15:40:30

D. 2007-01-07 15:40:30

9. Which statement best describes circumference?

A. Circumference is the distance around a circle.

B. Circumference is the width of a circle.

C. Circumference is the distance around any object.

D. Circumference is the area of a circle.