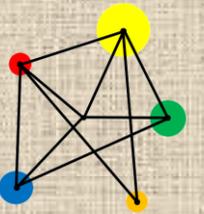


Scale Drawing



Use scale drawings to find lengths.

Vocabulary

Scale Drawing

A drawing in which lengths are an accurate representation of a real object.

Review of metric units of measurement

a) $1\text{cm} = \underline{\hspace{1cm}} \text{mm}$

b) $1\text{m} = \underline{\hspace{1cm}} \text{cm}$

c) $1\text{km} = \underline{\hspace{1cm}} \text{m}$

d) $1\text{m} = \underline{\hspace{1cm}} \text{mm}$

e) $1\text{km} = \underline{\hspace{1cm}} \text{cm}$

f) $1\text{km} = \underline{\hspace{1cm}} \text{mm}$

a) $1\text{mm} = \underline{\hspace{1cm}} \text{cm}$

b) $1\text{cm} = \underline{\hspace{1cm}} \text{m}$

c) $1\text{m} = \underline{\hspace{1cm}} \text{km}$

d) $16\text{mm} = \underline{\hspace{1cm}} \text{cm}$

a) $1\text{cm}^2 = \underline{\hspace{1cm}} \text{mm}^2$

Solutions

a) $1\text{cm} = \underline{10} \text{ mm}$

b) $1\text{m} = \underline{100} \text{ cm}$

c) $1\text{km} = \underline{1000} \text{ m}$

d) $1\text{m} = \underline{1000} \text{ mm}$

e) $1\text{km} = \underline{100\ 000} \text{ cm}$

f) $1\text{km} = \underline{1\ 000\ 000} \text{ mm}$

a) $1\text{mm} = \underline{0.1} \text{ cm}$

b) $1\text{cm} = \underline{0.01} \text{ m}$

c) $1\text{m} = \underline{0.001} \text{ km}$

d) $16\text{mm} = \underline{1.6} \text{ cm}$

a) $1\text{cm}^2 = \underline{100} \text{ mm}^2$

Key Fact

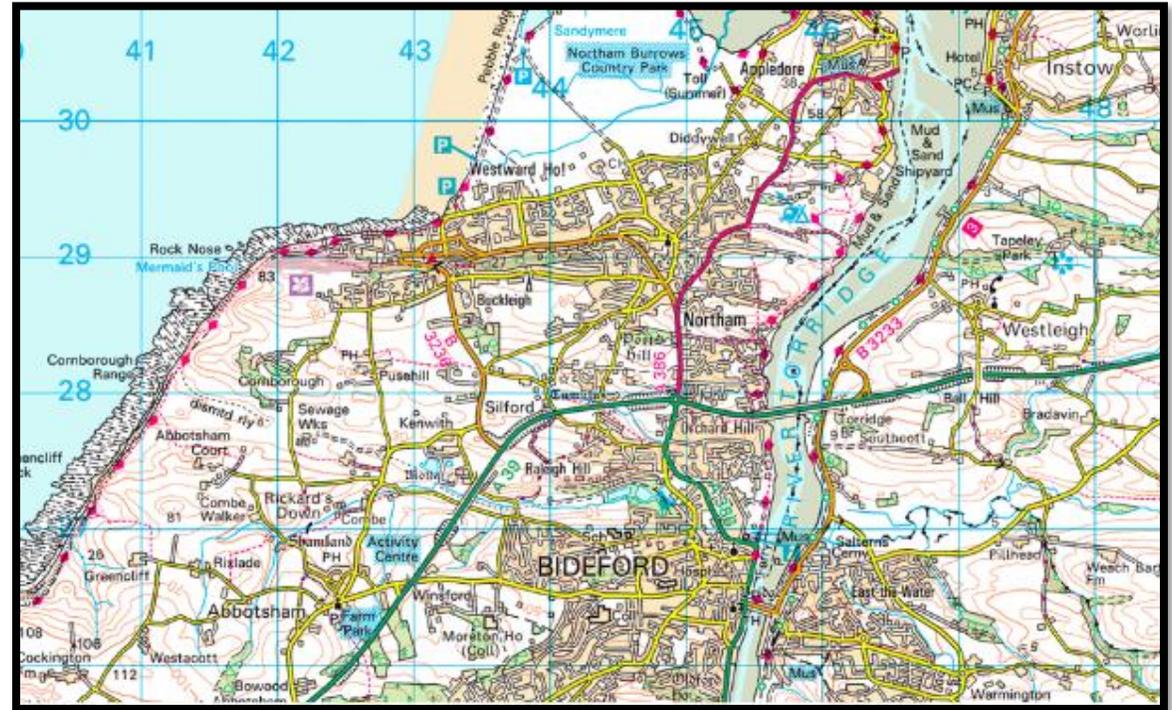
A **scale drawing** is an accurate representation of the real world.

A scale drawing must have a scale.

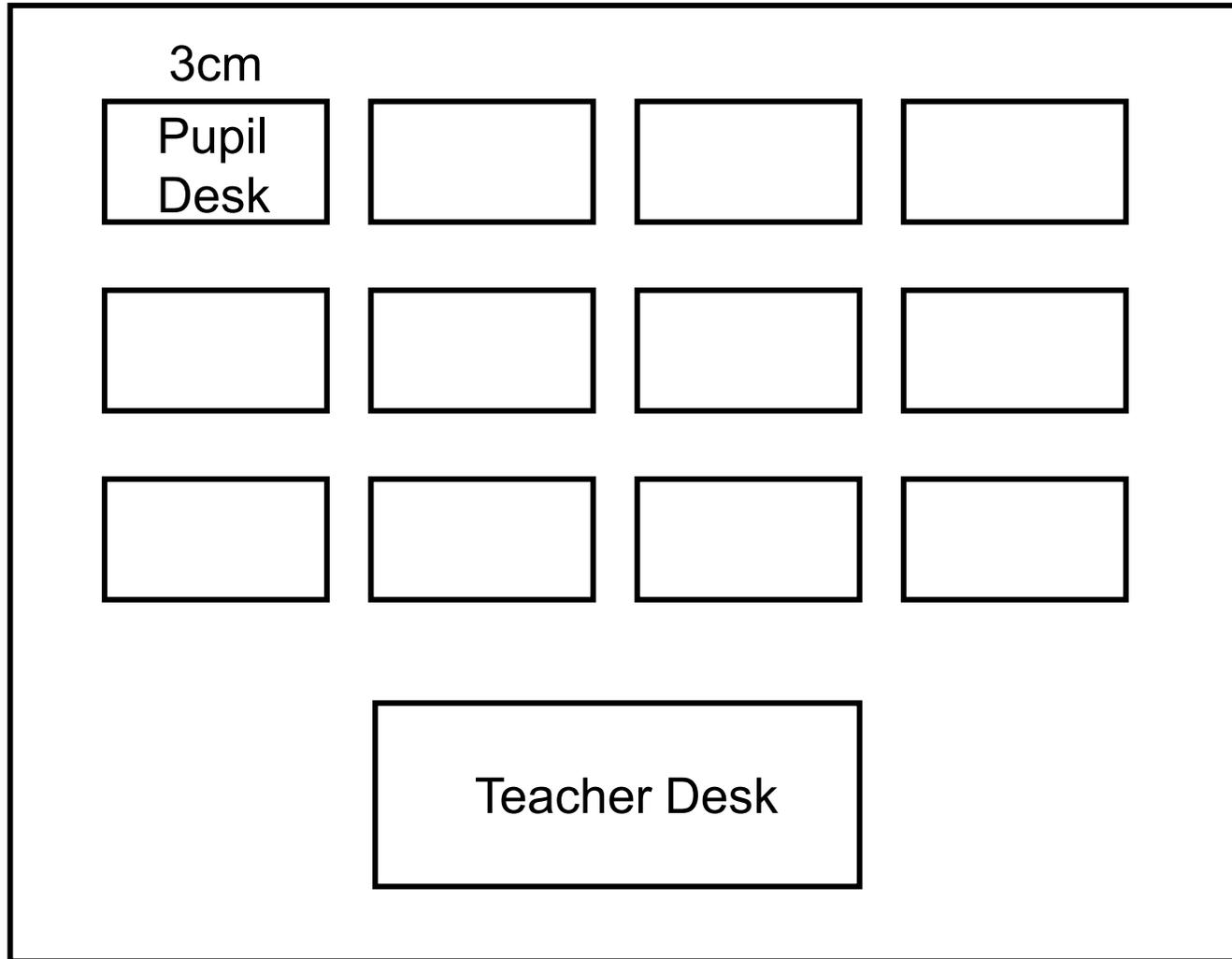
A map is an example of a scale drawing.

The **scale** of this map is 1 : 50 000.

This means that distances on the map need to be multiplied by 50 000 to find the real distance.



Example



Pola is producing a scale drawing of her classroom.

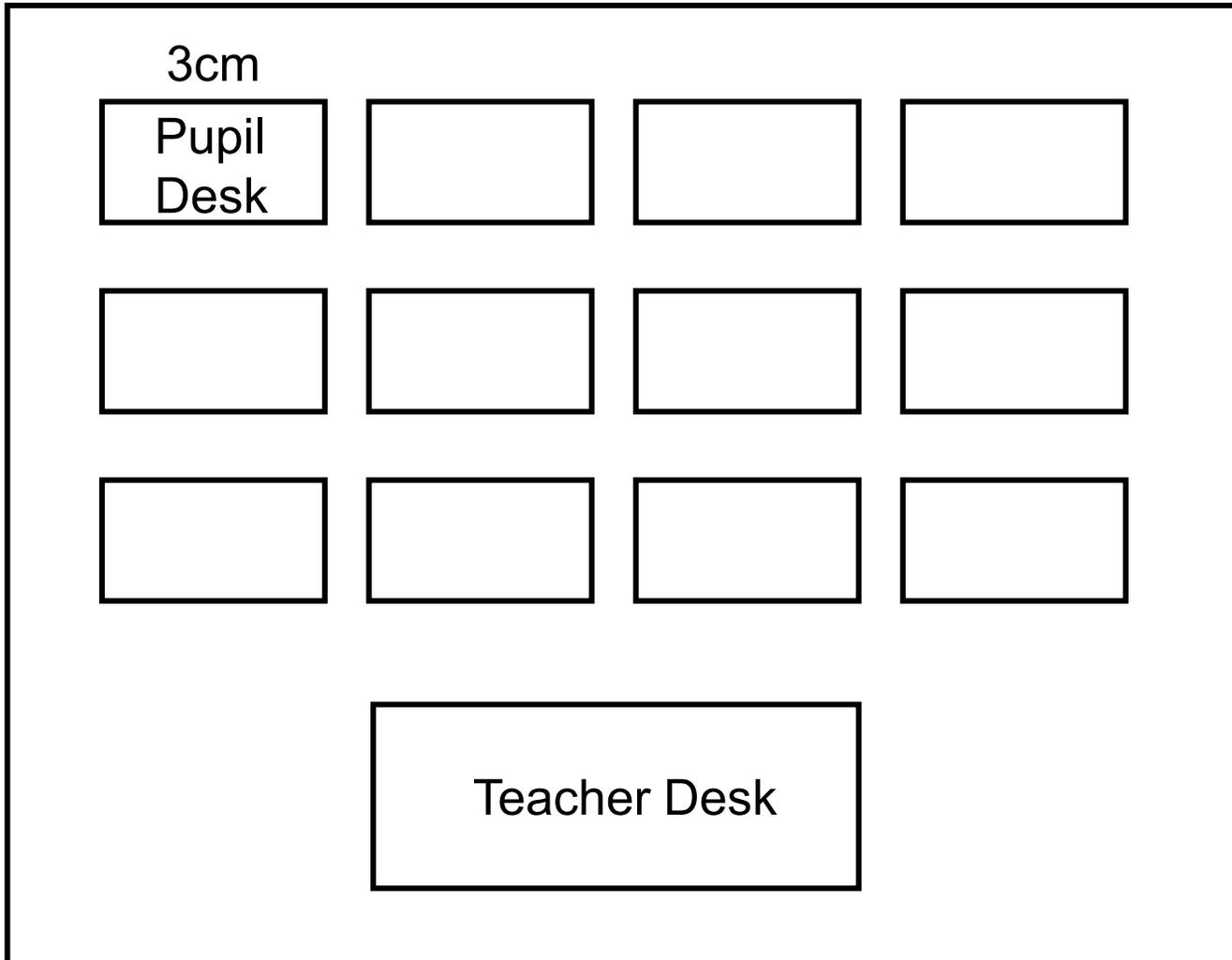
The scale is 1 : 50

a) What is the actual length of a pupil desk?

b) The actual length of the teacher desk is 240cm.

How long should it be in the scale diagram?

Solutions



Pola is producing a scale drawing of her classroom.

The scale is 1 : 50

a) What is the actual length of a pupil desk? **1m 50cm**

b) The actual length of the teacher desk is 240cm.

How long should it be in the scale diagram? **4.8cm**

Exercise

1. A map has a scale of 1 : 50 000
 - a) On the map the distance between two towns is 11 cm. What is the actual distance between the towns in km?
 - b) The distance between the hospital and the cinema is 2 km. How far apart would they be on the map?

2. Martha builds a model aeroplane using a scale of 1 : 250
 - a) The real aeroplane is 40m long. How many cm long is the model?
 - b) Martha decides to make a model pilot. What height should the model pilot be?

3. Massimo has two cubes.
One cube has sides 1cm long.
The other cube has sides 1m long.
 - a) What is the scale factor from the small cube to the large cube?
 - b) Is the surface area of the large cube enlarged by the same scale factor?
 - c) How many small cubes would fit into the large cube?

Solutions

1. A map has a scale of 1 : 50 000

- a) On the map the distance between two towns is 11 cm. What is the actual distance between the towns in km? **5.5 km**
 - b) The distance between the hospital and the cinema is 2 km. How far apart would they be on the map? **4 cm**
-

2. Martha builds a model aeroplane using a scale of 1 : 250

- a) The real aeroplane is 40m long. How many cm long is the model? **16 cm**
- b) Martha decides to make a model pilot. What height should the model pilot be? **0.8 cm**

3. Massimo has two cubes.
One cube has sides 1cm long.
The other cube has sides 1m long.

- a) What is the scale factor from the small cube to the large cube?
1 : 100
- b) Is the surface area of the large cube enlarged by the same scale factor?
No. Scale factor 1 : 10 000
- c) How many small cubes would fit into the large cube?
1 000 000

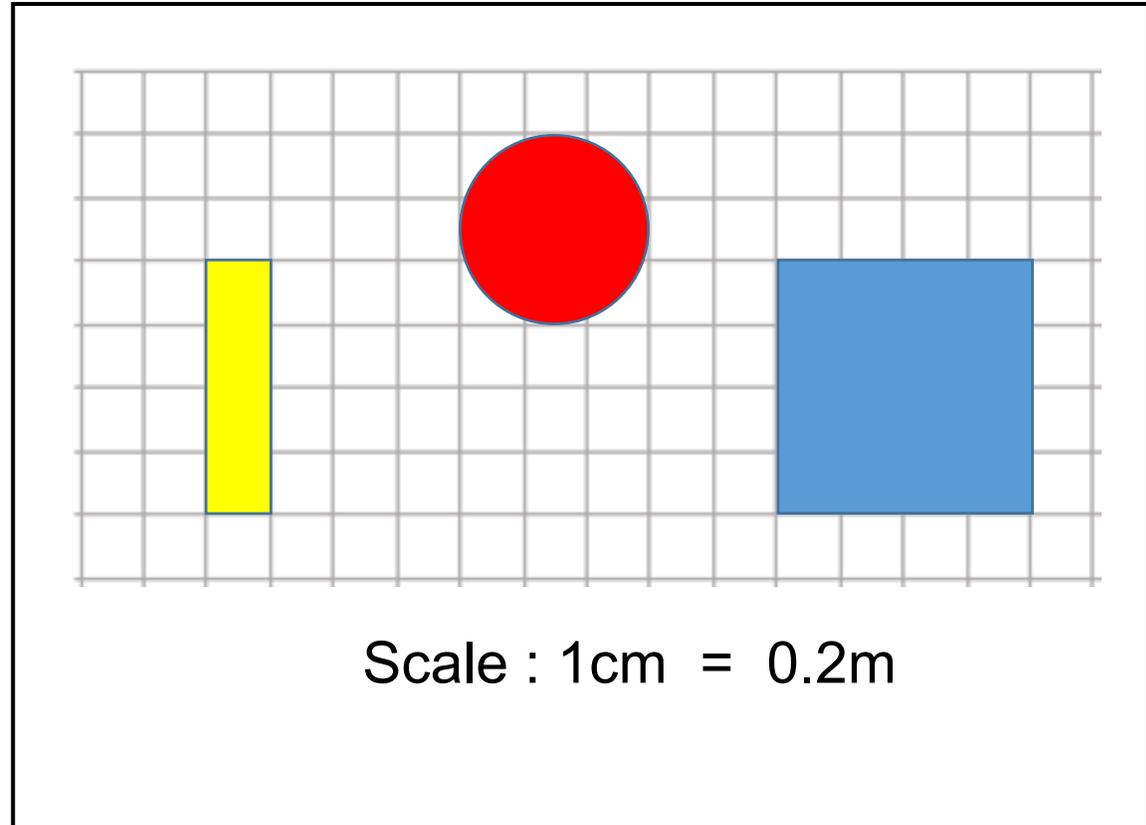
Question

Here is a scale drawing of some shapes that are to be printed out for a large display
It is drawn on a 1cm grid.

What is the actual perimeter
of the yellow rectangle? **2 m**

What is the actual area of
the blue square? **6400 cm²**

What is the actual
circumference of the red circle?
188.5 cm



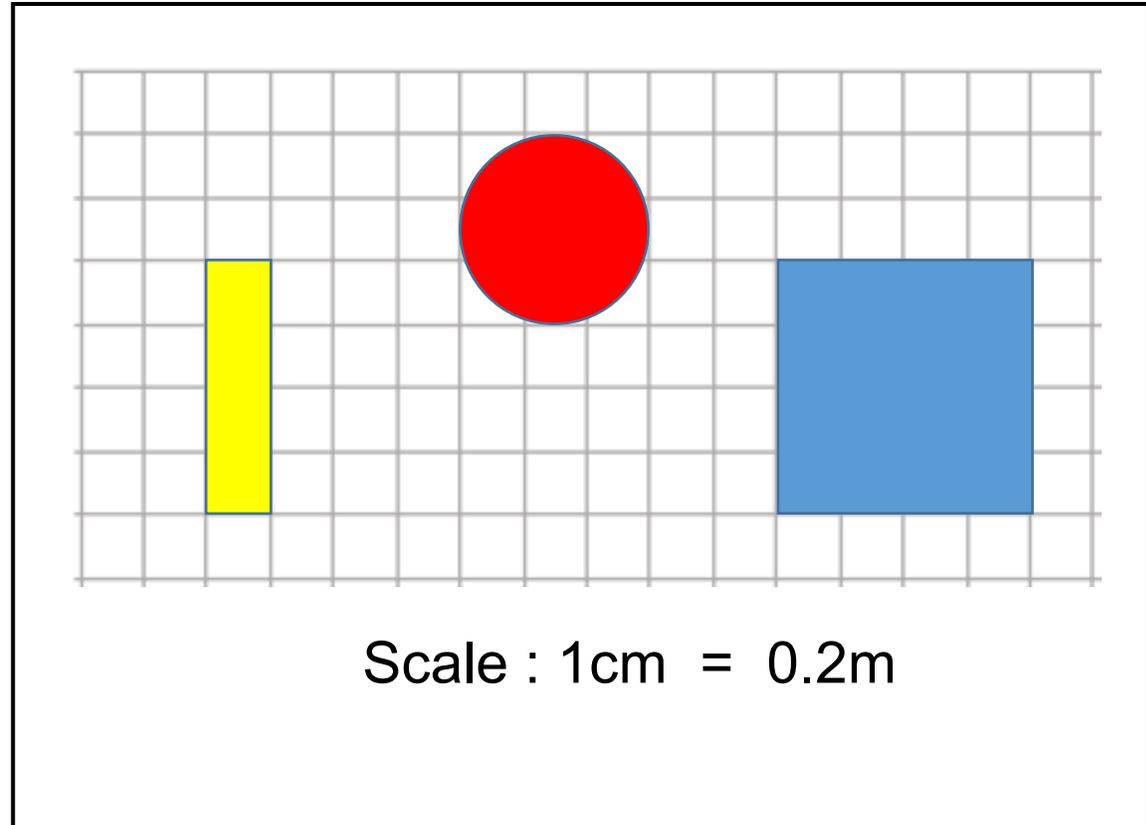
Solutions

Here is a scale drawing of some shapes that are to be printed out for a large display
It is drawn on a 1cm grid.

What is the actual perimeter
of the yellow rectangle? **2 m**

What is the actual area of
the blue square? **6400 cm²**

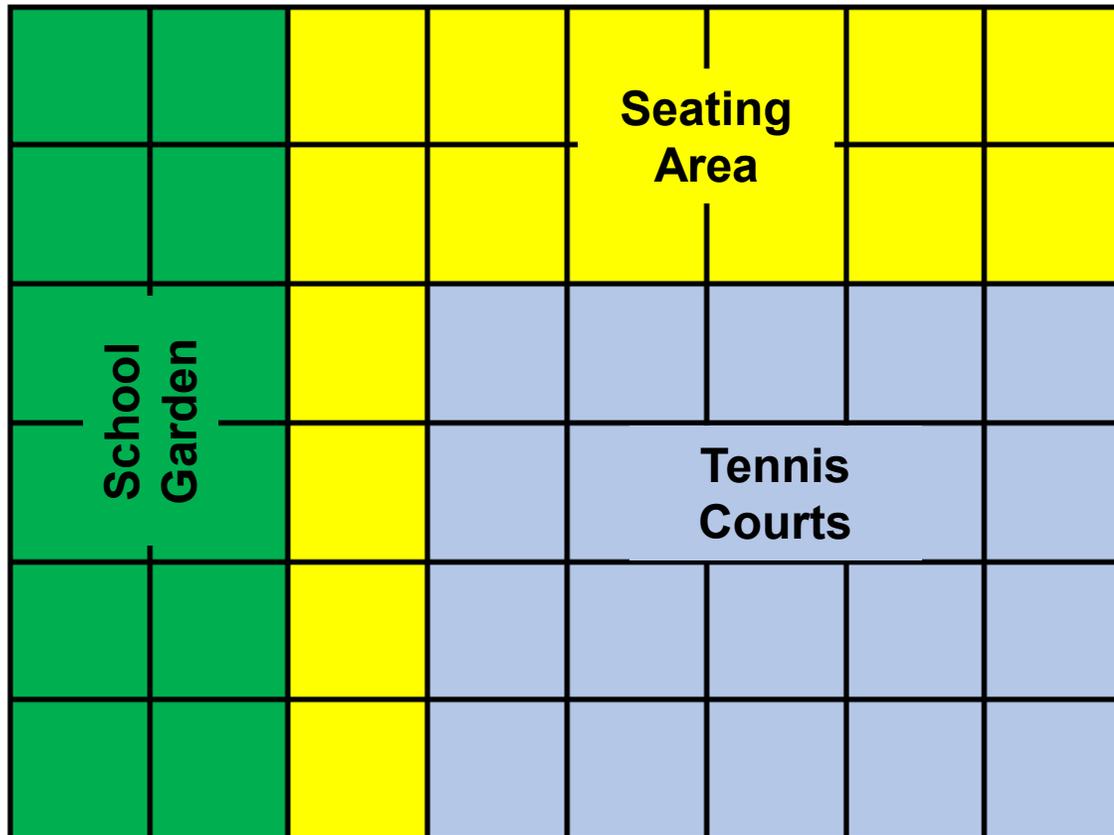
What is the actual
circumference of the red circle?
188.5 cm



Exercise

Henry has drawn a scale drawing of the school playground on centimetre squared paper.

The scale is $1\text{cm} = 2\text{m}$

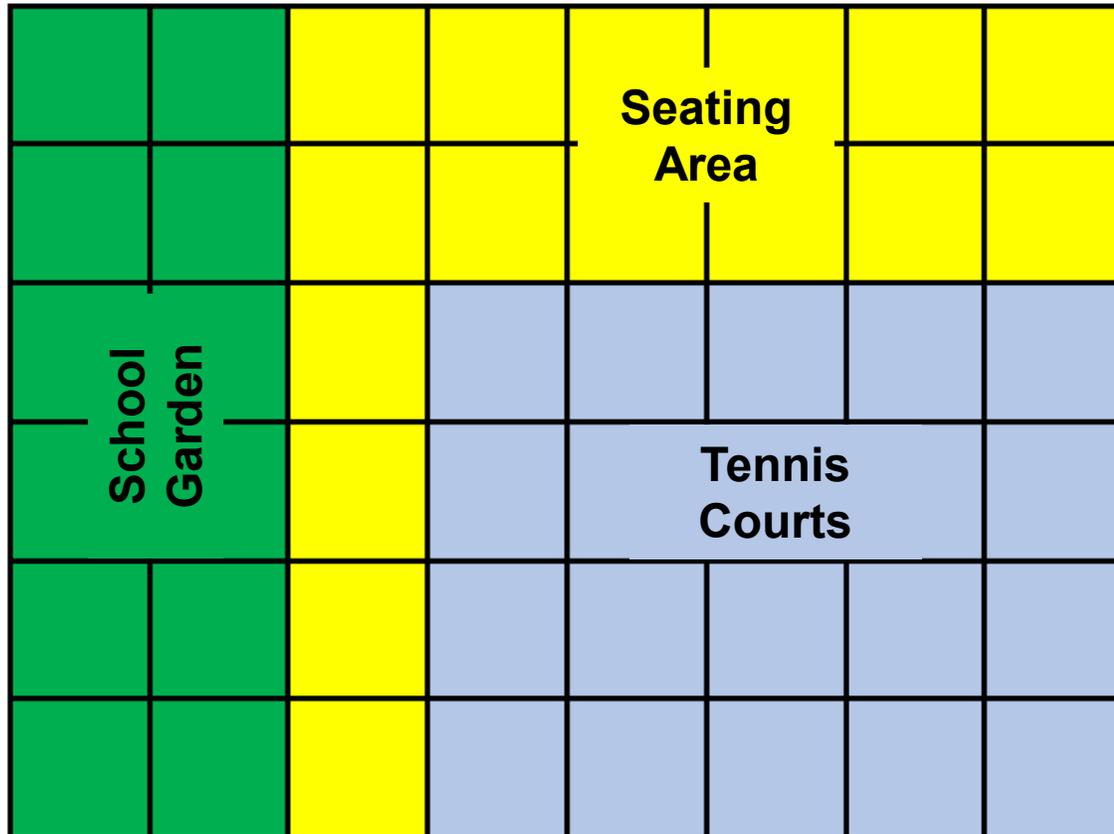


- What is the actual length of the school garden?
- What is the actual perimeter of the seating area?
- What is the actual area of the tennis courts?

Solutions

Henry has drawn a scale drawing of the school playground on centimetre squared paper.

The scale is $1\text{cm} = 2\text{m}$

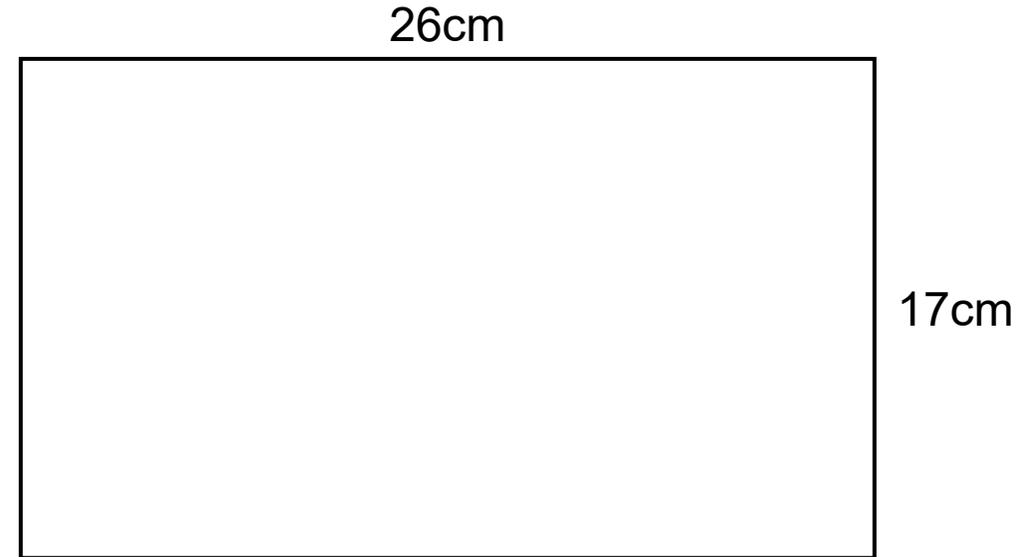


- What is the actual length of the school garden? **12 m**
- What is the actual perimeter of the seating area? **48 m**
- What is the actual area of the tennis courts? **80 m²**

Exam Style Question

The diagram shows a scale drawing of a football pitch.

The scale of the drawing is 1 : 400



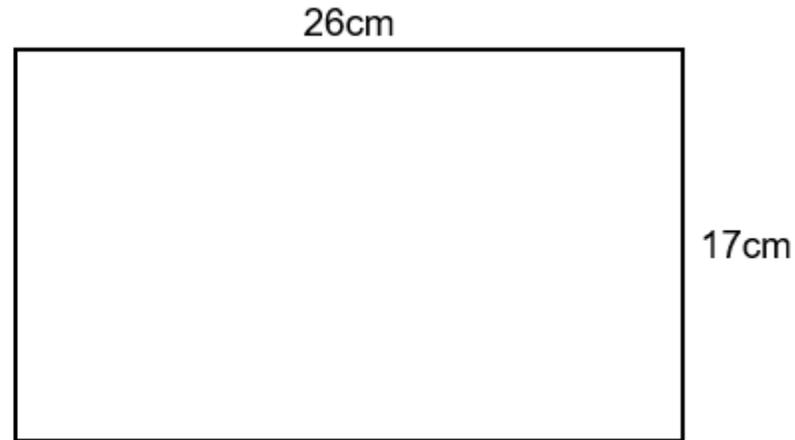
Work out the perimeter of the real football pitch.

Give your answer in metres.

Solution

The diagram shows a scale drawing of a football pitch.

The scale of the drawing is 1 : 400



Work out the perimeter of the real football pitch.

Give your answer in metres.

Perimeter of scale drawing

$$= 26 + 17 + 26 + 17$$

$$= \underline{86 \text{ cm}}$$

Perimeter of real pitch

$$= 400 \times 86$$

$$= 34\,400 \text{ cm}$$

$$= \underline{344 \text{ m}}$$