

Math 9 Adapted LG 4
Expectation 1 – Measurement, Estimates & Unit Conversions

Unit	Abbreviation	Type
Millimeter	mm	Metric
Centimetre	cm	
Meter	m	
Kilometer	km	
Inch	in	Imperial
Feet	ft	

10 mm = 1 cm

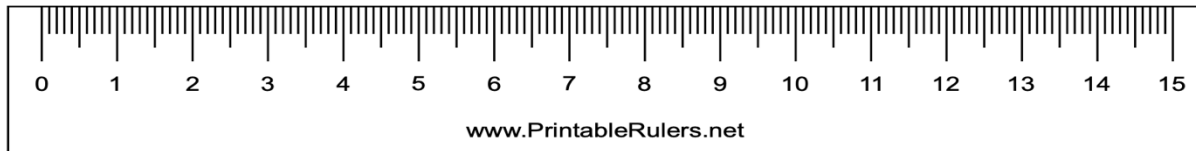
100 cm = 1 m

1000 m = 1 km

30 cm (ruler length) = 1 ft

12 inch = 1 ft

This ruler shows **15 cm**, 1 cm has 10 mm so it also shows **150 mm**



Estimating using referents (sizes you already know)

If 1 mm is approximately the width of a dime, in millimeters estimate:

Width of a charging cord: _____mm

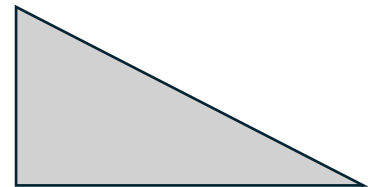
Width of a picky fingernail: _____mm

Width of a pencil: _____mm

Height of an ant: _____mm

Length & width of a skittle candy: _____mm & _____mm

Estimate & label the length of each side of the triangle below:



1 cm has 10 mm. If 1 cm is about the width of your pinky nail or a crayon, in cm estimate:

Width and length and height of your cell phone: _____ cm _____ cm _____ cm

Width and length of this paper: _____cm _____cm

Length of a full-sized subway sandwich: _____ cm

1 m has 100 cm. If 1 m is about the width of a doorway or distance from your shoulder to your fingertip (with arm outstretched). Estimate the following:

Height of a vending machine: _____ m

Height from the floor to the ceiling: _____ m

Walking distance from our class to the test centre: _____ m

1 km has 1000 m. If 1 km is about the distance from THSS to A&W, estimate the distance:

THSS to 7-11 (closest): _____ km

THSS to Haney Place Mall: _____ km

THSS to your home: _____ km

1 inch is about the distance from the tip of your thumb to the 1st knuckle. Estimate:

Width and length and height of your cell phone: _____ in _____ in _____ in

Width and length of this paper: _____ in _____ in

Length of a full-sized subway sandwich: _____ in

1 foot has 12 inches. If 1 foot is about the length of a 30 cm ruler, estimate:

Length of a full-sized subway sandwich: _____ ft

Height of a ceiling: _____ ft

Your height: _____ ft _____ in

Your teacher's height: _____ ft _____ in

On the next page we will be measuring shapes using a ruler. Please ask your teacher for a ruler if you do not have one of your own.

Measuring Length (A)

Name: _____ Date: _____ Score: _____

Measure the length of each bar **to the nearest centimeter**.

1.

Bar length:



2.

Bar length:



3.

Bar length:



4.

Bar length:



5.

Bar length:



6.

Bar length:



7.

Bar length:



8.

Bar length:



9.

Bar length:

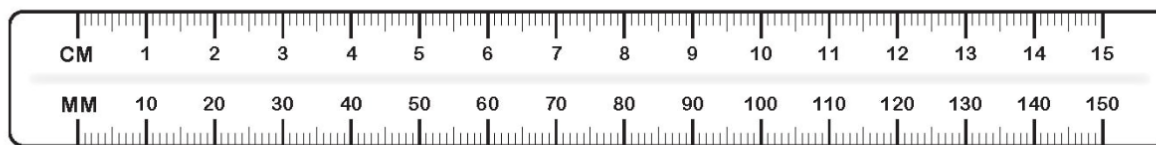


10.

Bar length:



Here is a 15 cm ruler.



You can use the ruler to help you with all these questions.

- 1) a) 6 cm = ____ mm b) ____ mm = 2 cm c) 9 cm = ____ mm
- d) 10 mm = ____ cm e) ____ cm = 150 mm f) 70 mm = ____ cm
- 2) a) 6 cm and 4 mm = ____ mm b) ____ mm = 12 cm and 3 mm
- c) 51 cm = ____ cm and ____ mm d) ____ cm and ____ mm = 118 mm
- 3) a) Find $7\frac{1}{2}$ cm on the ruler, how many mm is $7\frac{1}{2}$ cm? ____ mm

b) Use your answer to complete the table:

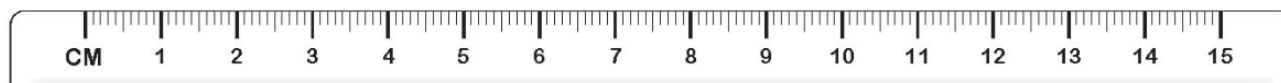
centimetres	centimetres and millimetres	millimetres
$1\frac{1}{2}$ cm	____ cm and ____ mm	____ mm
____ cm	4 cm and 5 mm	____ mm
____ cm	____ cm and ____ mm	125 mm

- 4) Mark the position of each measurement on the ruler below:

64 mm

$9\frac{1}{2}$ cm

13 cm and 7 mm



Conversions between units		
<p>Remember what millimeters look like on a ruler. They are tiny! Ten millimeters make 1 cm.</p> <p>Then verify from a measuring tape that 100 centimeters makes one meter. “Centi” means one hundred (from the Latin word <i>centum</i>). That is why 1 dollar has 100 <i>cents</i>, and 1 meter has 100 <i>centimeters</i>.</p> <p>Lastly, 1 kilometer is 1,000 meters, because “kilo” means one thousand.</p>		
1 km = 1,000 m	1 m = 100 cm	1 cm = 10 mm

3. One meter is 100 cm. Convert between meters and centimeters.

a. 5 m = _____ cm	b. 4 m 6 cm = _____ cm	c. 800 cm = _____ m
8 m = _____ cm	9 m 19 cm = _____ cm	239 cm = ____ m ____ cm
12 m = _____ cm	10 m 80 cm = _____ cm	407 cm = ____ m ____ cm

4. One centimeter is 10 mm. Convert between centimeters and millimeters.

a. 5 cm = _____ mm	b. 2 cm 8 mm = _____ mm	c. 50 mm = ____ cm ____ mm
8 cm = _____ mm	7 cm 5 mm = _____ mm	72 mm = ____ cm ____ mm
14 cm = _____ mm	10 cm 4 mm = _____ mm	145 mm = ____ cm ____ mm

5. One kilometer is 1,000 m. Convert between kilometers and meters.

a. 5 km = _____ m	b. 2 km 800 m = _____ m	c. 2,000 m = _____ km
23 km = _____ m	6 km 50 m = _____ m	4,300 m = ____ km ____ m
1 km 200 m = _____ m	13 km 579 m = _____ m	18,700 m = ____ km ____ m

6. Calculate. Give your answer using whole kilometers and meters.

a. 5 km 200 m + 8 km 900 m

b. 3 km 600 m + 2 km 800 m

c. 1,500 m + 2 km 600 m

d. 6×700 m

Expectation 2 - Calculating Perimeter (the distance around shapes)

Ex 1. Calculate the perimeter of the rectangle.

$$15 \text{ cm} + 15 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} =$$



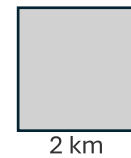
Ex. 2. Calculate the perimeter of square.

*Remember squares all have the same side length so...

$$2 \text{ km} + 2 \text{ km} + 2 \text{ km} + 2 \text{ km} =$$

or

$$4 \times 2 \text{ km} =$$



Ex. 3. Calculate the perimeter of this shape.

1st – be sure that you have a length for all sides!

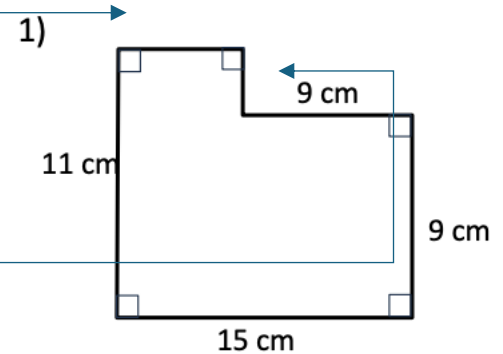
You try:

$$\text{Missing length: } 15 \text{ cm} - 9 \text{ cm} = 6 \text{ cm}$$

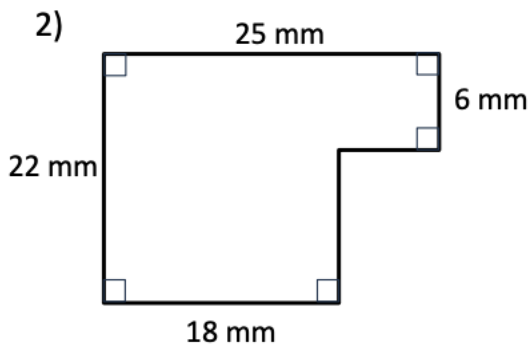
$$\text{And } 11 \text{ cm} - 9 \text{ cm} = 2 \text{ cm}$$

$$\text{Perimeter} = 11 \text{ cm} + 6 \text{ cm} + 2 \text{ cm} + 9 \text{ cm} + 9 \text{ cm} + 15 \text{ cm}$$

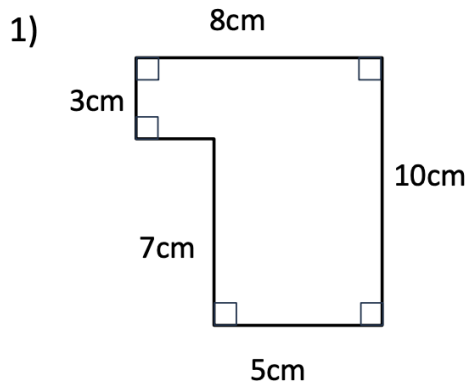
=



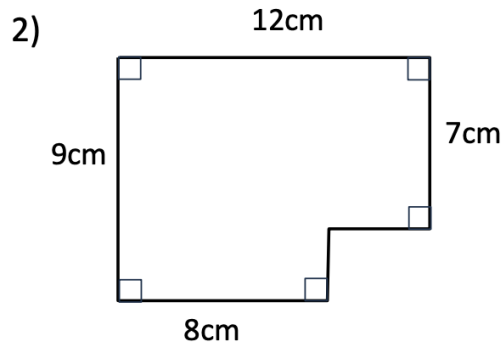
You try:



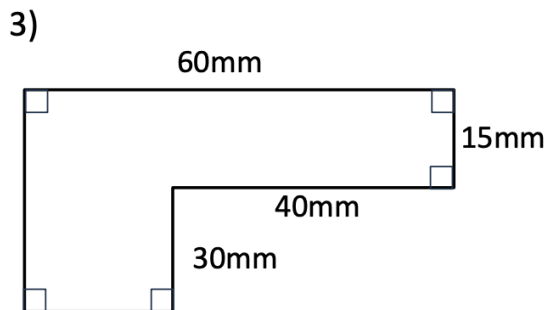
Find the length of the missing sides and then work out the perimeter of each shape.
The shapes are not drawn to scale.



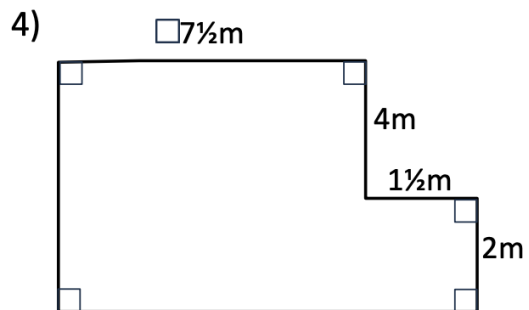
Perimeter = _____ cm



Perimeter = _____ cm



Perimeter = _____ mm

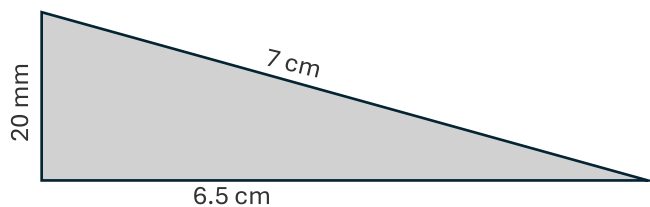


Perimeter = _____ m

Check your answers: 36 cm, 42 cm, 210 mm, 30 m

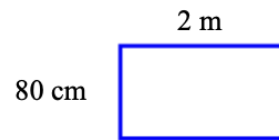
Always be sure that your units are the same on all sides that you measure!

Perimeter of this triangle is:

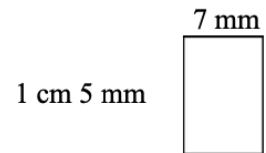


7. Solve.

a. Find the perimeter of this rectangle.



b. Find the perimeter of this rectangle.



c. One side of a square measures 5 cm 6 mm. What is its perimeter?

d. *A challenge.* A square has a perimeter of 6 cm. How long is its side?

8. Solve the problems.

a. How many millimeters are in a *meter*?

b. John jogs around a track 1 km 800 m long twice a day, five days a week.
How long a distance does he jog in a day?

In a week?

c. Gary is 1 m 34 cm tall and Jared is 142 cm tall.
How much taller is Jared?

Kathy's wallpaper has butterflies that are 8 cm wide. She will put the wallpaper in her room. How many complete butterflies can she have on a wall that is 1 meter long?

How about if the wall is 3 meters long?

Puzzle Corner

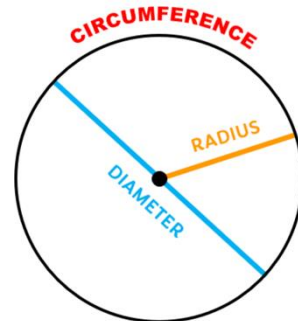


Expectation 3 - Circles

Radius – distance from the center to edge (half diameter)

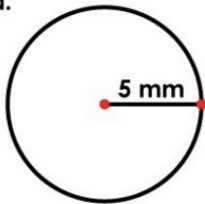
Diameter – width of circle through center (twice the radius).

Circumference – the perimeter of a circle



What is the radius and diameter of each circle?

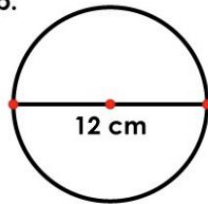
a.



radius = _____

diameter = _____

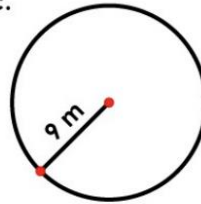
b.



radius = _____

diameter = _____

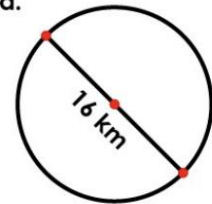
c.



radius = _____

diameter = _____

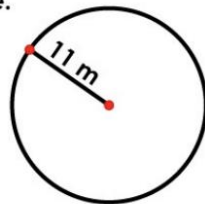
d.



radius = _____

diameter = _____

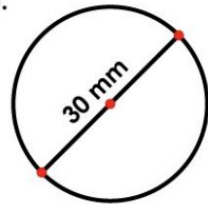
e.



radius = _____

diameter = _____

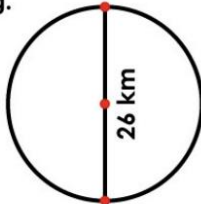
f.



radius = _____

diameter = _____

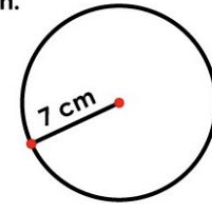
g.



radius = _____

diameter = _____

h.

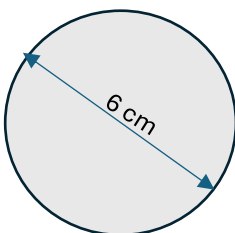


radius = _____

diameter = _____

To determine the circumference (perimeter) of a circle:

Diameter: 6 Radius: 3



$$C = \pi d \quad \text{OR} \quad C = 2\pi r$$

diameter

radius

$$C = \pi \times 6$$

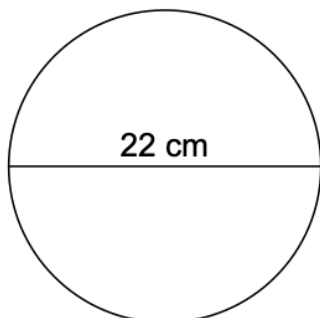
OR

$$C = 2 \times \pi \times 3$$

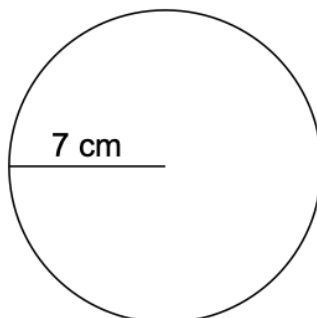
$$C = \pi d \quad \text{OR} \quad C = 2\pi r$$

Find the circumference of each circle from the given radius or diameter.

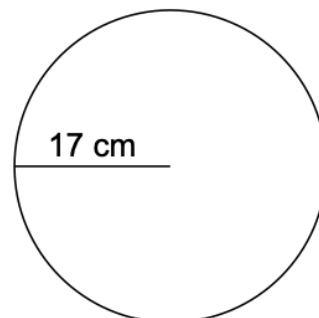
1.



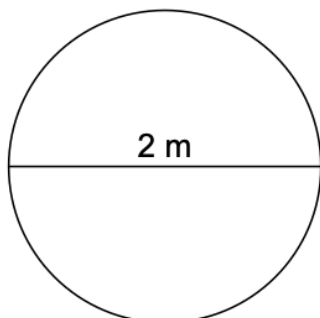
2.



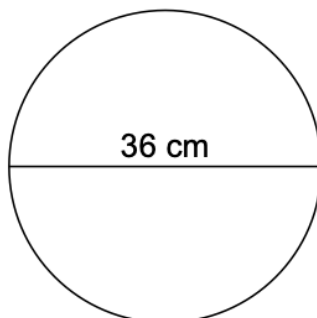
3.



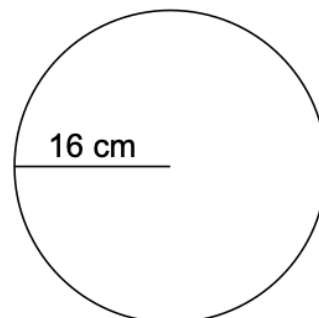
4.



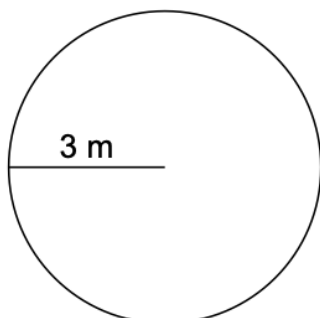
5.



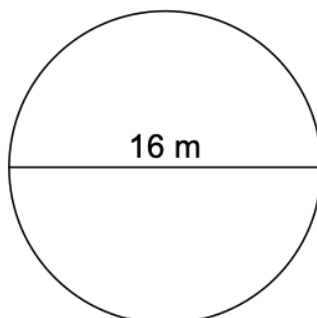
6.



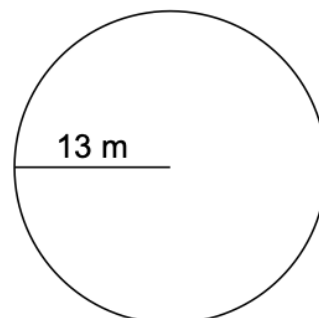
7.



8.



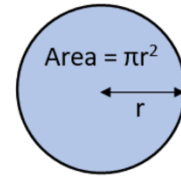
9.



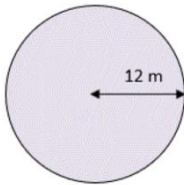
Expectation 4 – Area of 2D Shapes

Area is the amount of surface that an object has.

Area of a CIRCLE: Area = $\pi \times r^2$



Example 1. What is the area of the circle?

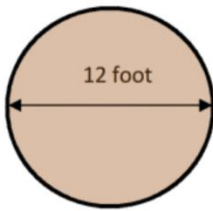


Radius =

Area = $\pi \times r^2$

Area =

Example 2. Calculate the area of the circle?

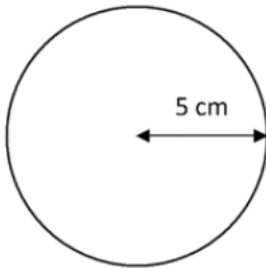


Radius =

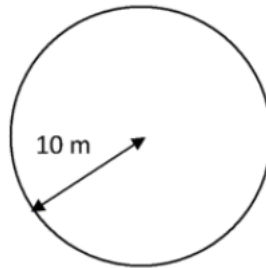
Area = $\pi \times r^2$

Area =

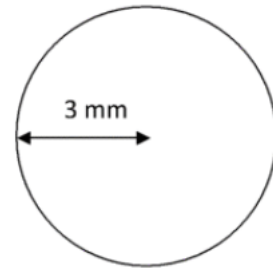
1)



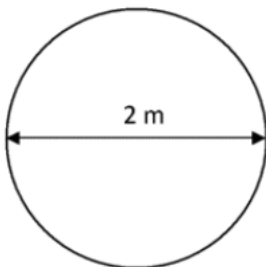
2)



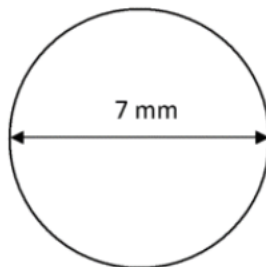
3)



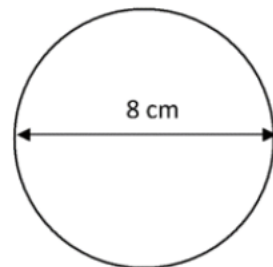
4)



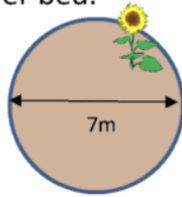
5)



6)

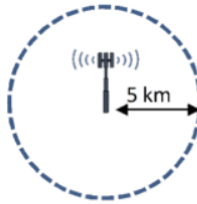


-
- 1) A circular flower bed has a diameter of 7m.
Work out the area of the flower bed.



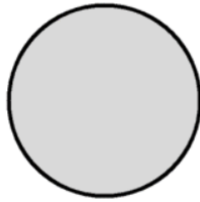
Area of the flower bed is _____ square yards.

- 2) A cell phone mast has a range of 5km in all directions. Work out the area covered by one mast.



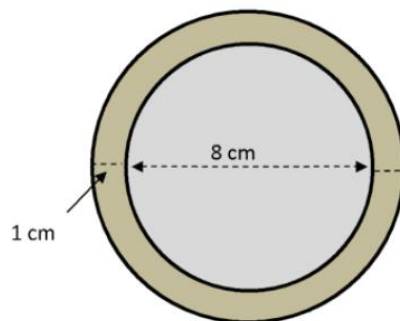
Area covered by the mast is _____ .

- 3) A circular mirror has an area of 144π square cm.
What is the diameter of the mirror?



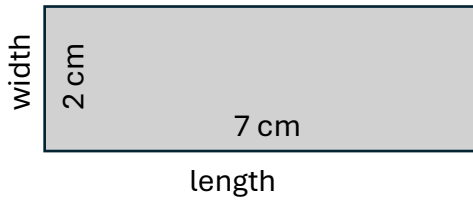
The diameter of the mirror is _____ cm.

- 1) A small circular mirror has a 1 cm frame around it.
The mirror itself is 8 cm in diameter.
What is the area of the frame?



The area of the frame is _____ .

Area of a RECTANGLE:

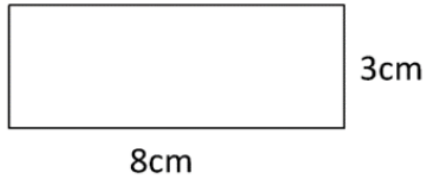


Area = length x width

$$\text{Area} = 7 \text{ cm} \times 2 \text{ cm} = 14 \text{ cm}^2$$

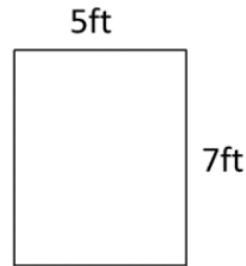
(14 square cm)

1)



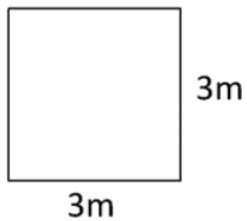
Area = _____ square cm

2)



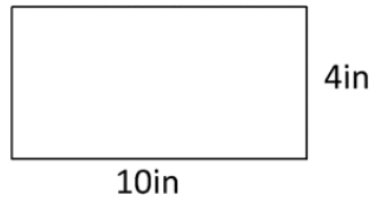
Area = _____ square ft

3)



Area = _____ square m

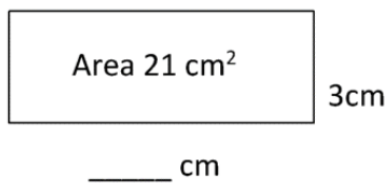
4)



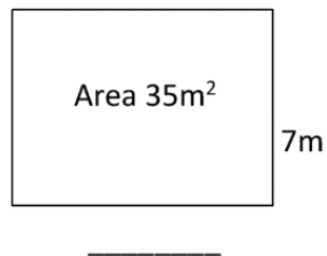
Area = _____ square in

Use the area and the side measurements to find the length of the missing side.

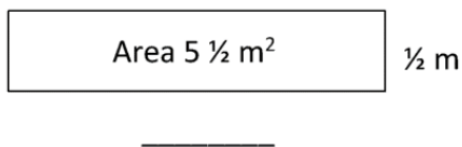
1)



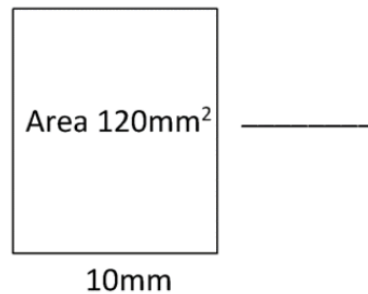
2)



3)



4)



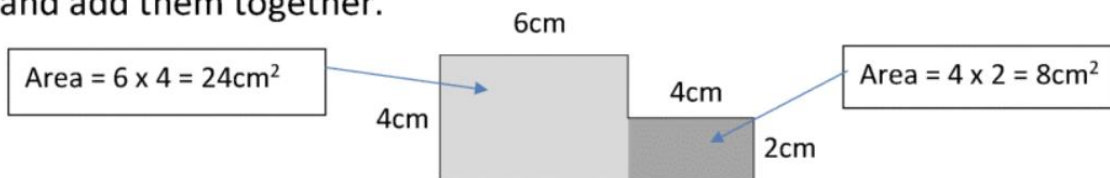
Name _____

Date _____



AREA OF RECTILINEAR SHAPES SHEET 2

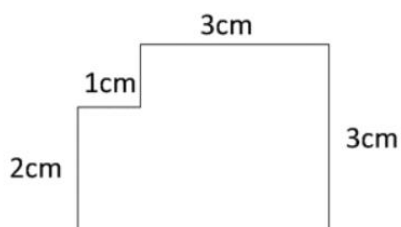
To find the area of these shapes, work out the area of the two rectangles and add them together.



The total area of this shape is $24\text{cm}^2 + 8\text{cm}^2 = 32\text{cm}^2$.

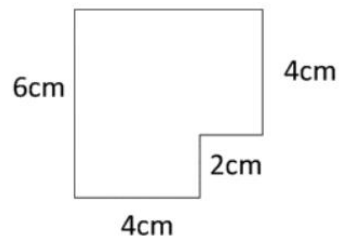
Work out the area of the following shapes (not to scale):

1)



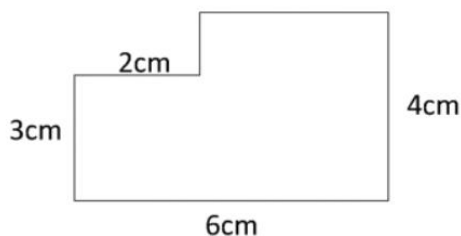
Area = _____ cm^2

2)



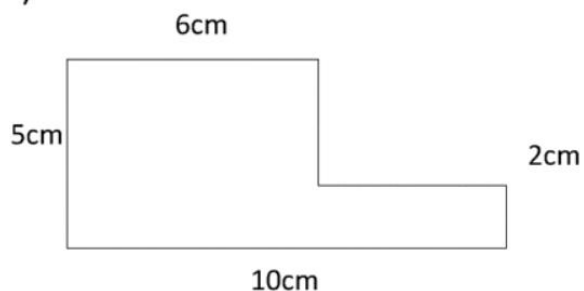
Area = _____ cm^2

3)



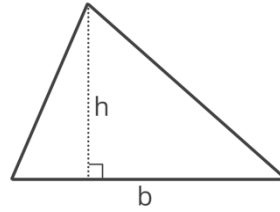
Area = _____

4)



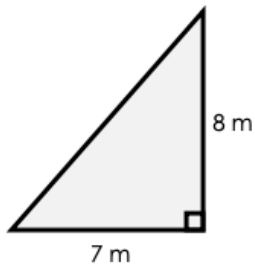
Area = _____

Area of a TRIANGLE = base x height \div 2

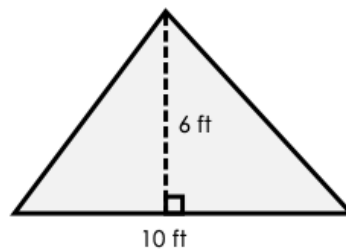


Find the area of each triangle.

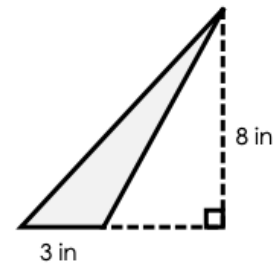
a.



b.



c.



a. Area = $b \times h \div 2$

=

b. Area = $b \times h \div 2$

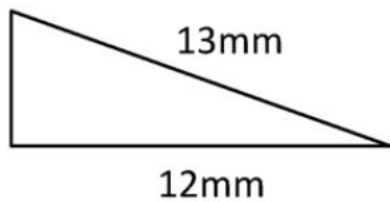
=

c. Area = $b \times h \div 2$

=

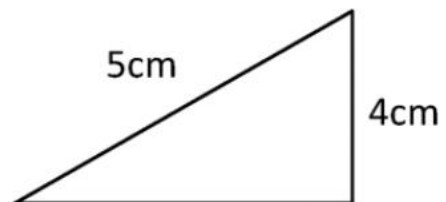
You try:

1)



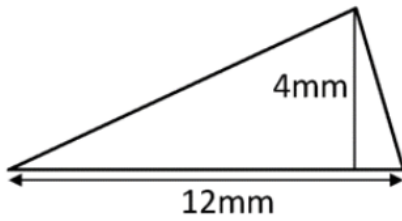
Area = _____ mm²

2)



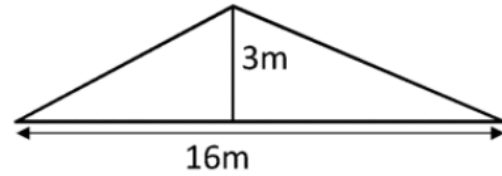
Area = _____ cm²

3)



Area = _____ mm²

4)



Area = _____ m²

Name _____

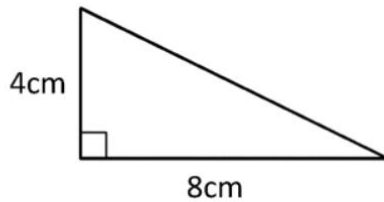
Date _____



TRIANGLE AREA SHEET 2

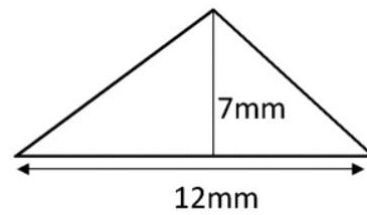
Work out the area of the following triangles. They are not drawn to scale.
Use the formula at the bottom of the page to help you.

1)



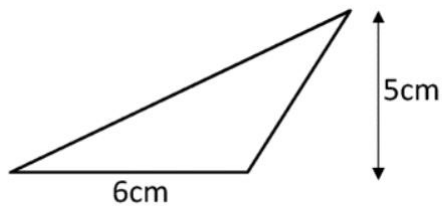
Area = _____ cm²

2)



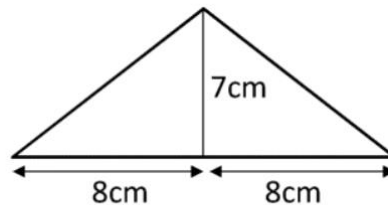
Area = _____

3)



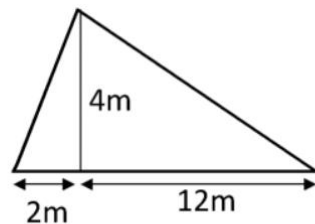
Area = _____

4)



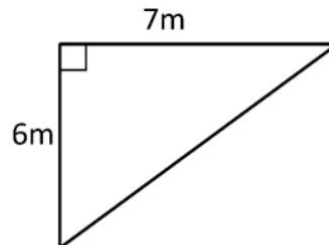
Area = _____

5)



Area = _____

6)



Area = _____