

## Patterns

1. A plumber uses this table to calculate the charges for carrying out work. He charges a call out charge plus a charge for every hour the work takes.

(a) Complete the table:

Number of hours worked ( $n$ )	2	3	4	5		10
Cost (£ $C$ )	49	61	73			

(b) Find a formula for calculating the cost when you know the number of hours a piece of work will take.

2. Art students at college were asked to design a bracelet.

Julie made up this design from bars and chains.



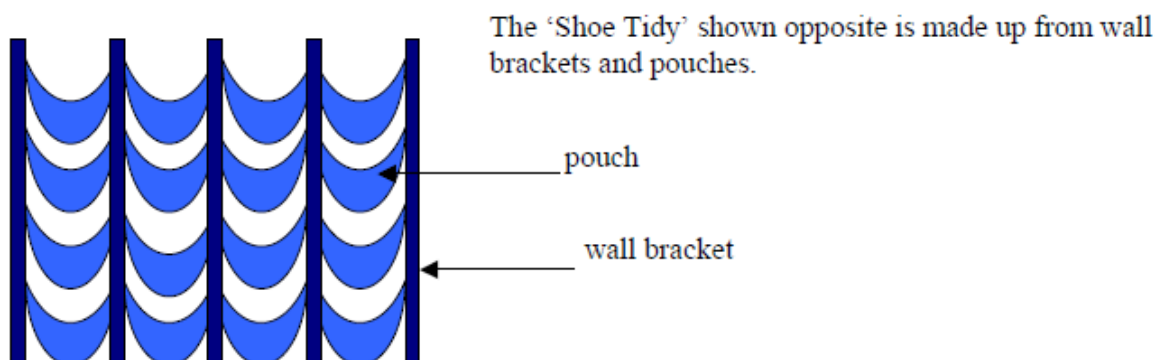
(a) Complete this table for the above pattern.

Number of bars ( $b$ )	2	3	4		8
Number of chains ( $c$ )					

- (b) Write down a formula for calculating the number of chains ( $c$ ) when you know the number of bars ( $b$ ).
- (c) Julie has 57 pieces of chain. How many bars will she need if she wants to use all the pieces of chain?

## Patterns

3.



(a) Complete the table above.

Number of wall brackets ( $w$ )	2	3	4	5		12
Number of pouches ( $p$ )	4	8				

(b) Write down a formula for calculating the number of pouches ( $p$ ) when you know the number of wall brackets ( $w$ ).

(c) How many wall brackets would be needed if 76 pouches are required?

4. Milly bought a new top which has some coloured glass diamonds and beads round the neck. Here is how the pattern is built up.



Pattern 1

1 Diamond

5 Beads



Pattern 2

2 Diamonds

8 Beads



Pattern 3

3 Diamonds

11 Beads

(a) Complete the table for the number of diamonds and number of beads in other patterns.

Number of Diamonds (N)	1	2	3	4	5		10
Number of Beads (B)	5	8	11				

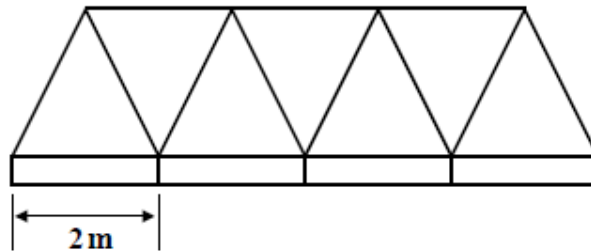
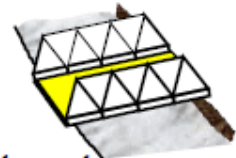
(b) Write down the formula for finding the number of beads needed for any number of diamonds.

## Patterns

5. A company makes bridge sides to any length. Each side is made up of triangular and rectangular sections.

Each rectangular section is 2 metres long.

The diagram below shows a single bridge side with four rectangular base plates.



- (a) Complete the table below for different lengths of single bridge side.

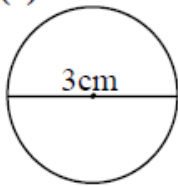
Number of rectangles ( $r$ )	2	3	4	5	6		12
Number of triangles ( $T$ )			7				

- (b) Write down a formula for calculating the number of triangles ( $T$ ), when you know the number of rectangles ( $r$ ) for a single bridge side.
- (c) A bridge **with two sides** has a total of 78 triangular sections.  
What is the total length of this bridge?

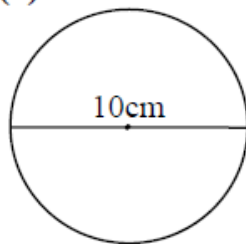
## Circle

1) Calculate the area of the circles below :

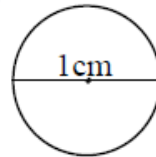
(a)



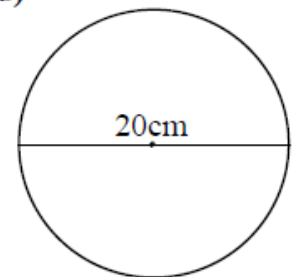
(b)



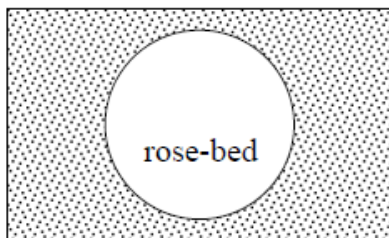
(c)



(d)



2)



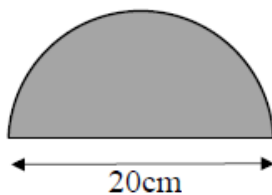
Simon is cutting a circular area from his lawn to plant a rose-bed.

If the diameter of the rose-bed is 1m, what area of lawn will he need to remove?

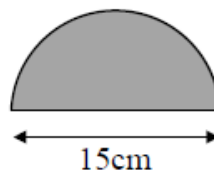
3)

Calculate the area of each semi-circle below.

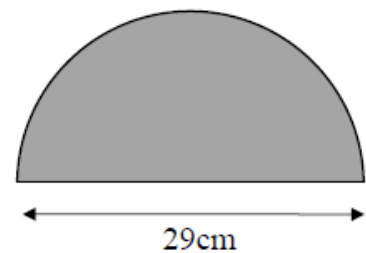
(a)



(b)



(c)

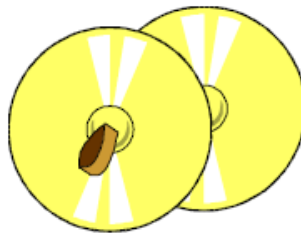


## Circle

- 4) Santino has a circular power saw.  
The radius of the blade is 10cm.  
What is the area of the blade?



- 5) The radius of a cymbal is 18cm. Calculate the area of one of them.

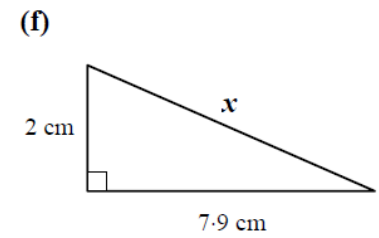
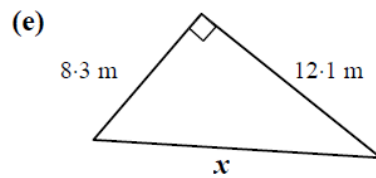
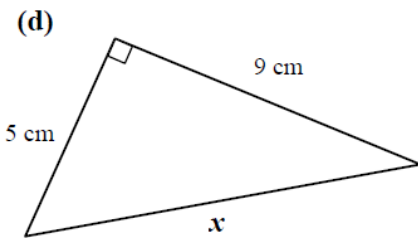
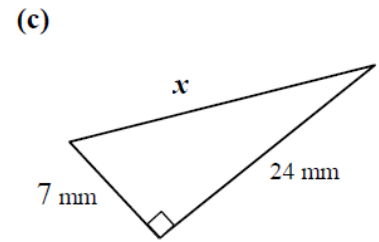
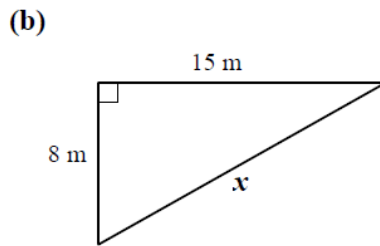
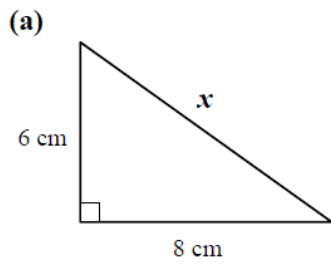


- 6) The diameter of the top of a pin is 7mm.  
Calculate the total area of the tops of 5 of them.

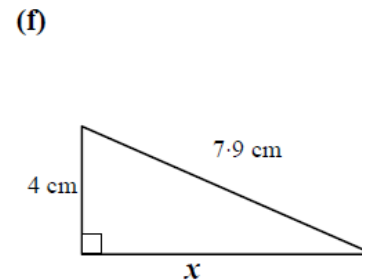
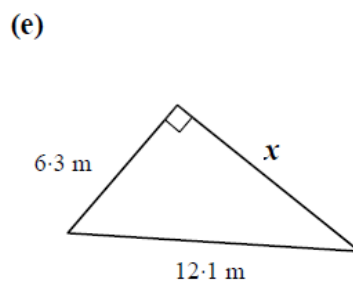
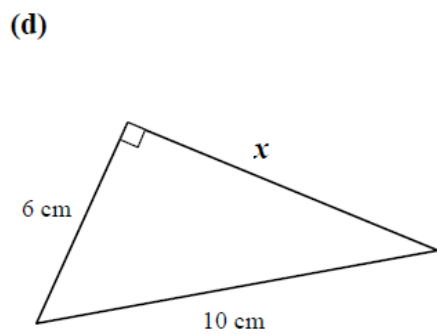
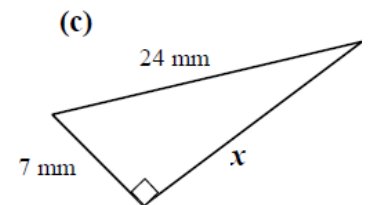
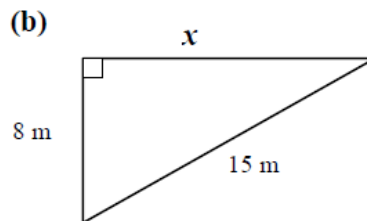
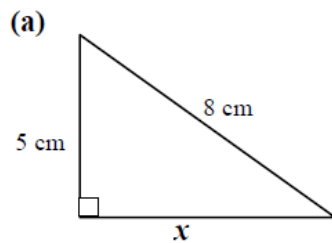


# Pythagoras

1. Find the length of the hypotenuse, marked  $x$ , in each of the following triangles.



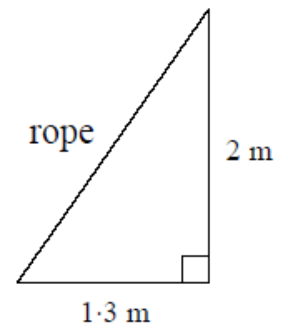
2. Find the length of the side, marked  $x$ , in each of the following triangles.



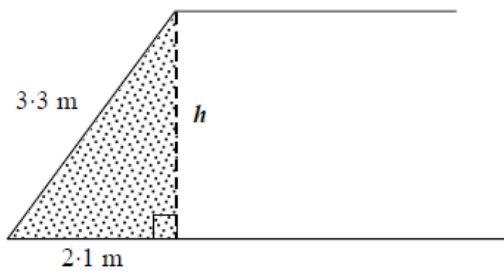
## Pythagoras

3. Guy ropes are used to support a tent pole. The pole is 2 metres high and the guy rope is fixed 1.3 metres from the bottom of the pole.

What is the length of the guy rope?

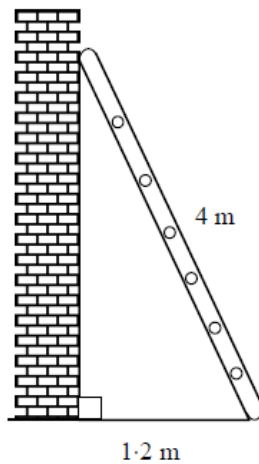


4.



Jim's house has an attic room with a sloping end wall. He is going to make a fitted cupboard. What will be the height of the cupboard,  $h$  ?

5.

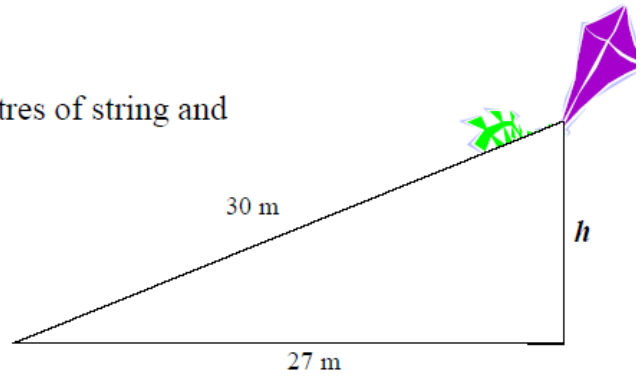


John's ladder is 4 metres long. He sets it up so that the foot of the ladder is 1.2 metres from the wall.

How far up the wall will the ladder reach?

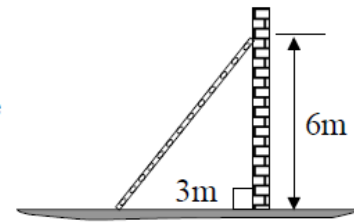
# Pythagoras

6. Eddie is flying his kite. He lets out 30 metres of string and moves 27 metres from his starting point. How high is the kite above the ground?

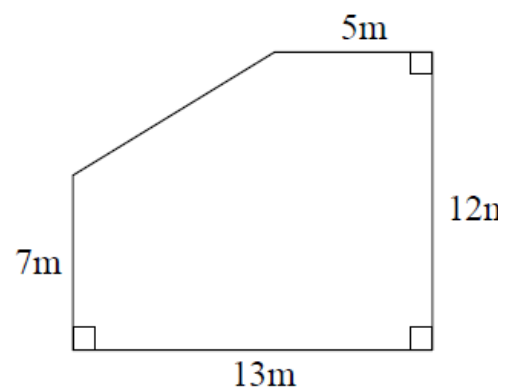
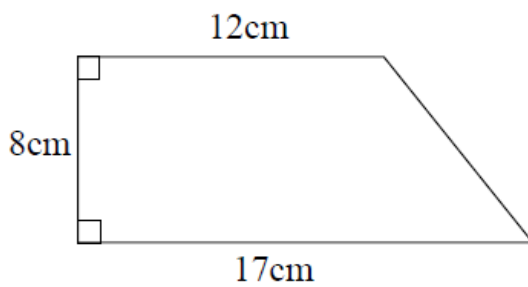


7. Answers should be rounded to 1-decimal place where necessary.

A ladder leans against a wall as shown in the diagram opposite. From the information given calculate the length of the ladder.



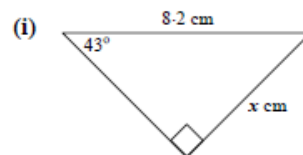
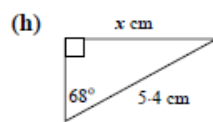
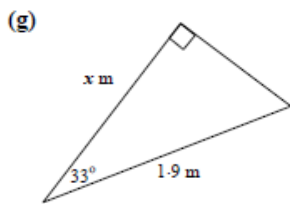
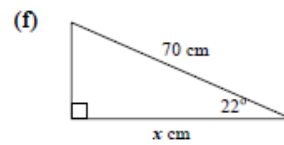
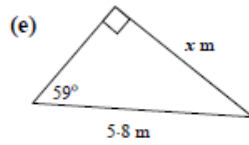
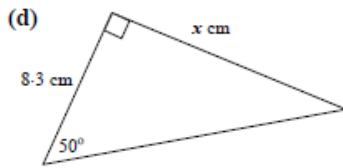
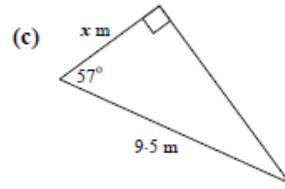
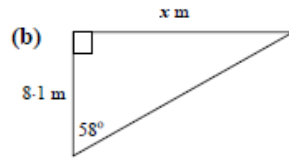
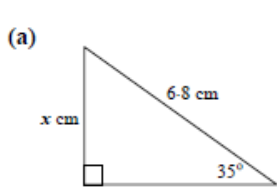
8. Calculate the perimeter of each shape below.





# SOHCAHTOA

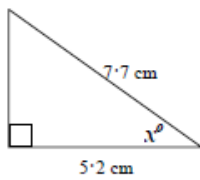
1) Calculate the length of the side marked  $x$  in these right-angled triangles. You will have to choose which ratio to use.



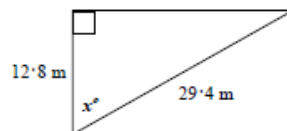
## SOHCAHTOA

2) Calculate the size of the angle marked  $x^\circ$  in these right-angled triangles. You will have to choose which ratio to use.

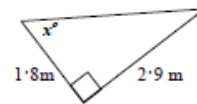
(a)



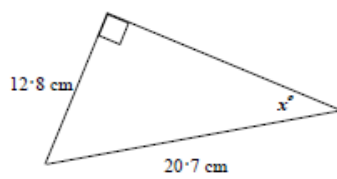
(b)



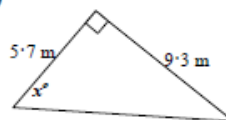
(c)



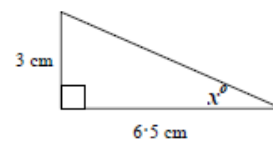
(d)



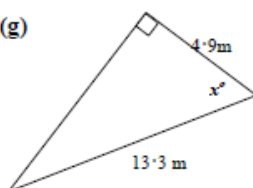
(e)



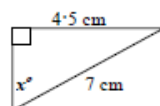
(f)



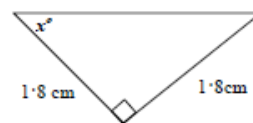
(g)



(h)



(i)



## SOHCAHTOA

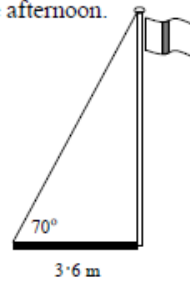
3)

This diagram shows the shadow cast by a flagpole early in the afternoon.

The shadow's length is 3.6 metres.

What is the height of the flagpole?

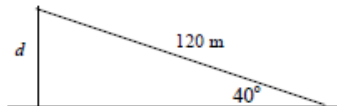
(Give your answer to 1 d.p.)



4)

A 120 m long anchor holds a fishing boat in position. The line makes an angle of  $40^\circ$  with the sea floor.

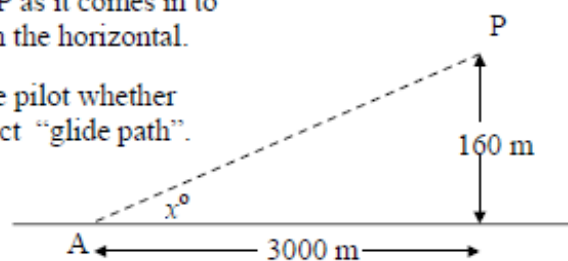
How deep is the sea at this position?



## SOHCAHTOA

- 5) The angle of approach,  $x^\circ$ , of a plane P as it comes in to land should be between  $3^\circ$  and  $5^\circ$  with the horizontal.

The air traffic controller has to tell the pilot whether he is too high, too low or on the correct "glide path".



An incoming plane is 3000 m away from its landing point A and is at a height of 160 m as shown in the diagram.

Is the plane too high, too low or on the correct "glide path"?

- 6) In triangle ABC, angle BAC is  $48^\circ$ .  
Calculate the length of BC.

