

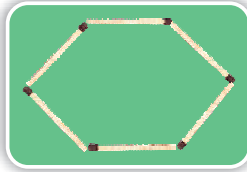
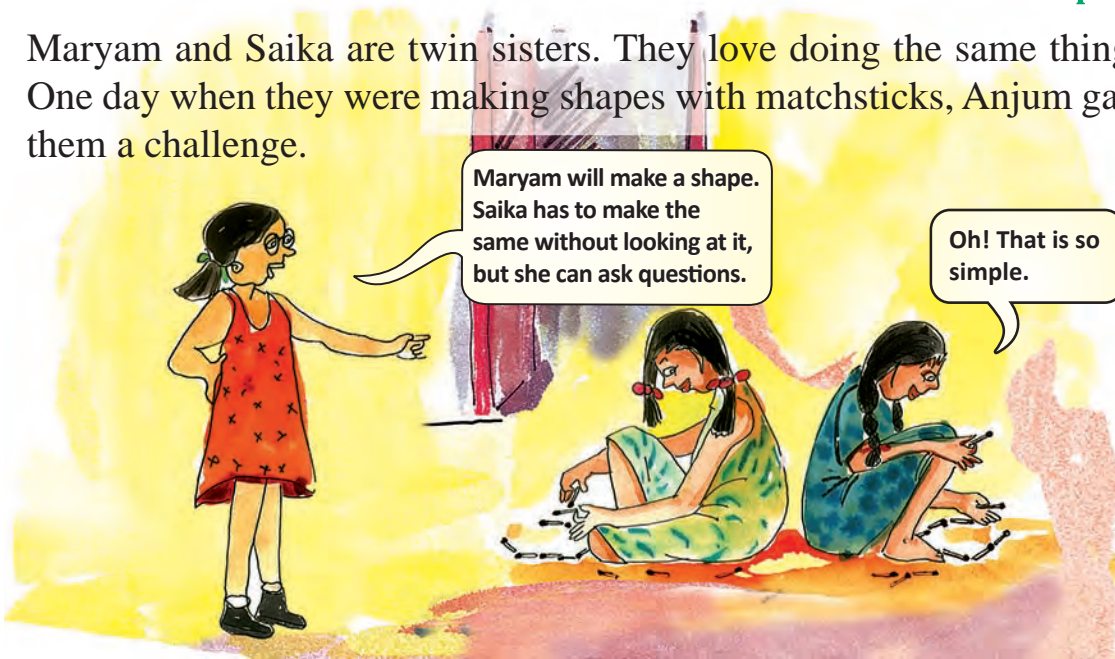
# Contents

Chapter	Page Number
1. Shapes and Angles	1
2. How Many Squares	21
3. Parts and Wholes	37
4. Does it look the Same?	58
5. Be My Multiple, I'll be Your Factor	76
6. Can You See the Pattern?	91
7. Boxes and Sketches	108
8. Tenths and Hundredths	118
9. Area and its Boundary	135
10. Smart Charts	150
11. Ways to Multiply and Divide	159
12. How Big? How Heavy?	176

# Shapes and Angles

## Chapter 1

Maryam and Saika are twin sisters. They love doing the same things. One day when they were making shapes with matchsticks, Anjum gave them a challenge.

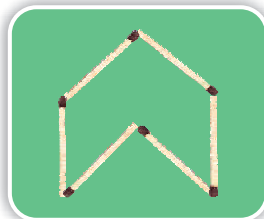


Maryam made this shape.

Saika- Is it a closed shape or an open shape?

Maryam- It is a closed shape.

Saika – How many sides are there?



Maryam – It has 6 sides.

Now you give the answers.

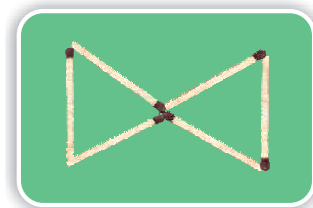
Is it a closed shape? \_\_\_\_\_.

Does it have six sides? \_\_\_\_\_.

But it is not the same as the one made by Maryam.

So Saika tried again.

This is what she made.

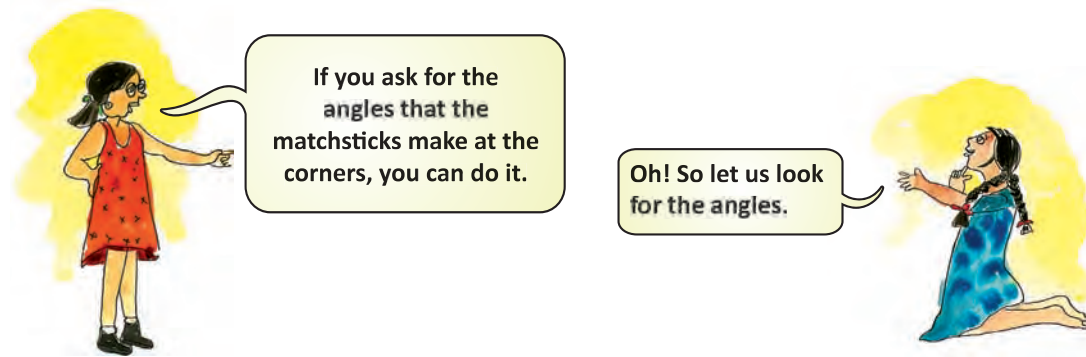


Is it a closed shape with 6 sides? \_\_\_\_\_.

Is it the same made by Maryam? \_\_\_\_\_.

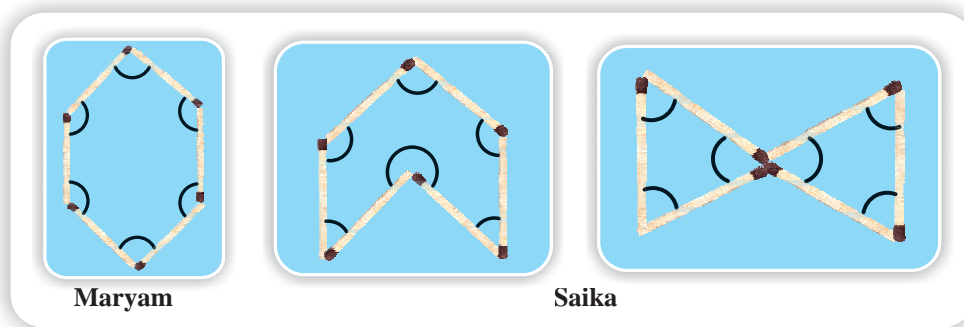
Is there some way to say in what way these shapes are different?




❖ Saika is now tired of trying and asks Anjum what to do.



❖ Look at the angles marked in these shapes.

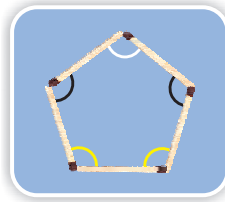
Can you the difference?



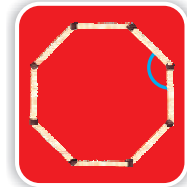
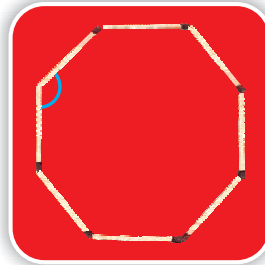
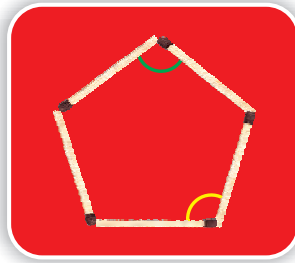
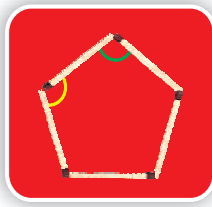
See, how the matchsticks make a small angle , a big angle , and a bigger angle .



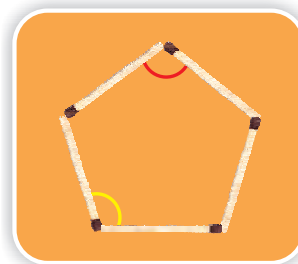
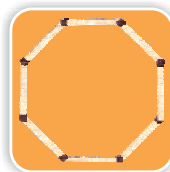
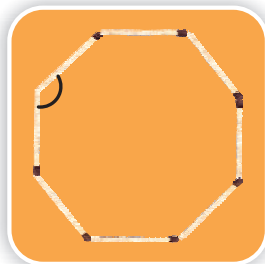
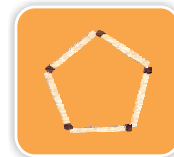
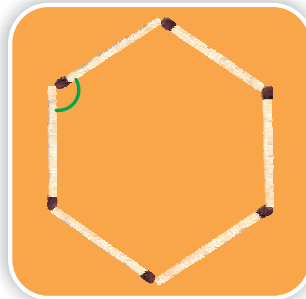
## Let Us Do These



- Look at the shape and answer.
  - ❖ The angle marked in \_\_\_\_\_ colour is the biggest angle.
2. [a] Are the angles marked with yellow equal? \_\_\_\_\_  
 [b] Are the marked with green equal? \_\_\_\_\_  
 [c] Are the angles marked with blue equal? \_\_\_\_\_



- Four different angles are marked in four colours. Can you find other angles which are the same as the one marked in red?





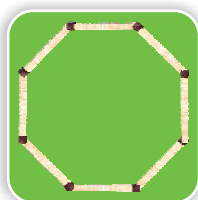
4. How many different shapes can you make by changing the angle between the matchsticks in each of these? Try.

(a)



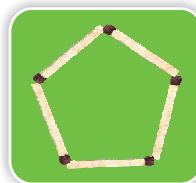
4 matchsticks

(b)



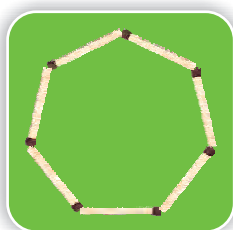
8 matchsticks

(c)



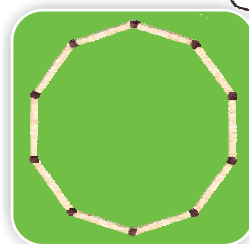
5 matchsticks

(e)

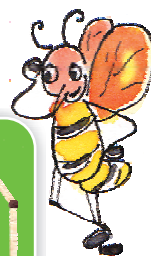


7 matchsticks

(f)



10 matchsticks



5. Two line segments with a common end point form an angle.

- Draw five examples of angles that you can see in your classroom
- An angle is formed by \_\_\_\_\_ rays.
- The common end point is called the \_\_\_\_\_ of an angle.
- The symbol used for an angle is \_\_\_\_\_.
- Name the given angle?
- BA and BC are called \_\_\_\_\_ of the angle.
- Draw an angle and name it in three different ways.

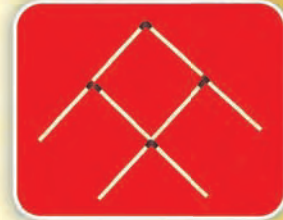
### Answers:

- 5 (a) Corner of a Book, Duster, Floor, Table, Stool etc.  
 (b) Two (c) Vertex (d)  $\angle$  (e)  $\angle ABC$   
 (f) Arms (g)  $\angle ABC$  or  $\angle CBA$  or  $\angle A$  or 1 etc.



## Matchstick Puzzles

4. Make 8 triangles using 6 matchsticks. Try!
5. Take 8 matchsticks and make a fish like this. Now pick up any 3 matchsticks and put them in such a way that the fish now starts swimming in the opposite direction. Did it?
6. Using 10 matchsticks make this shape. Pick up 5 matchsticks and put them in such a way that you get the shape of a house.



If you have not been able to solve these then look for the answers on page 14.



## Angle Tester

How do we make equal angles?




Let us make an angle tester.



You also have an angle tester in your geometry box. It is called a divider.



- ❖ Cut two strips from a cardboard sheet.
- ❖ Fix them with a drawing pin or  such that both the strips can move around easily.



Ulfat and Gazala went all around with the angle tester to look for different angles in their class.

Ulfat tested the angle of the Math's book and the pencil box.








- ❖ Go around with your tester and draw here those things in which tester opens like the letter L. Are you sure they are all right angles.



### Practice Time

1. Look at the angles in the pictures and fill the table.

Angle	Right Angle	More than a Right Angle	Less than a Right Angle
			✓
			
			
			
			

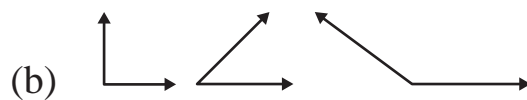


2.

- (a) Give three examples of a right angle from your classroom.
- (b) Draw a right angle, less than a right angle and greater than a right angle

**Answers:**

- (a) Corner of a table, Black board, Duster etc.

**Activity**

- a. Take a square sheet of paper.



- b. Fold it in half.



- c. Fold it once more and press it.



- d. Open the last fold so that the sheet is folded in half.



- e. Take one corner and fold it to meet the dotted line.



On the paper you will find lines making a right angle, an angle less than a right angle and an angle more than a right angle.

Look for each of the angles and mark them with different colours.



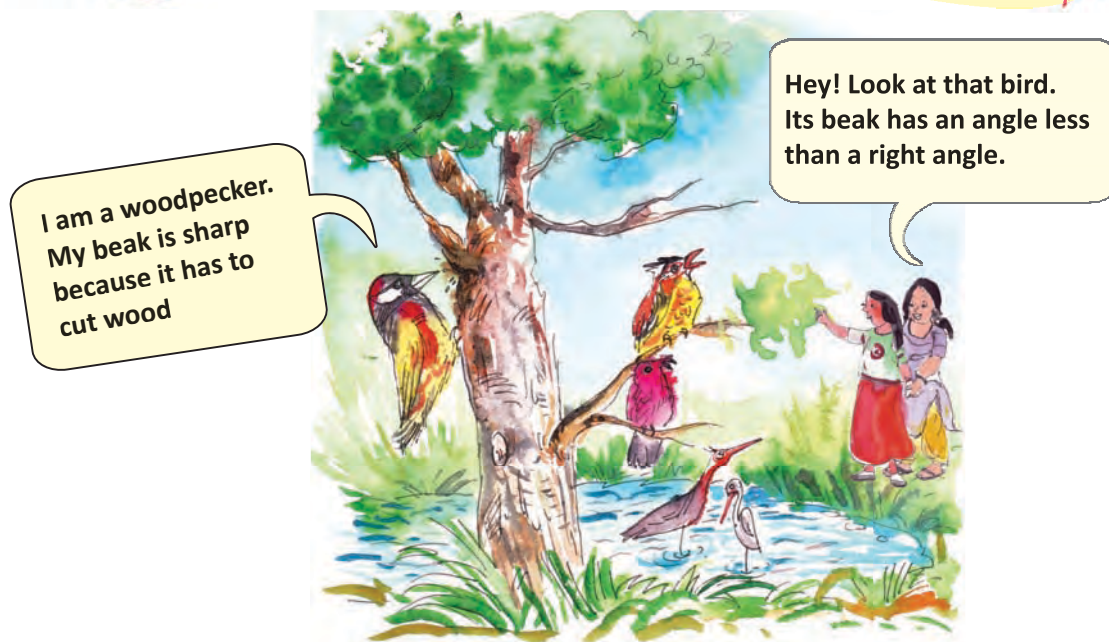
## Angle Garden



## Activity



Collect some leaves from the garden. Colour each leaf and print it. Look at the angle on the leaves. Which of them are more / less than a right angle?



- ❖ Look for the birds which have beaks with small angles.
- ❖ In the picture mark angles between the two branches. Which two branches have the biggest angle?
- ❖ Write 3 names using straight lines and count the angles.

Name	Number of right angles	Number of angles more than a right angle	Number of angles less than a right angle.

### Activity

- a. Put 10 Merry math books on top of each other. Keep one book slanting to make a slide.
  - b. Now do these with six books.
- ❖ Roll a ball from the top. From which slide does the ball roll down faster?
  - ❖ Which slide has the smallest angle?



These are two slides in a park.

- ❖ Which slide has a larger angle?
- ❖ Which slide do you think is safer from the little boy? Why?

## Changing Shapes

- ❖ Things you need – used (or new) matchsticks. Piece of rubber tube used in cycle valves.

i. Clean the black end of the matchsticks.



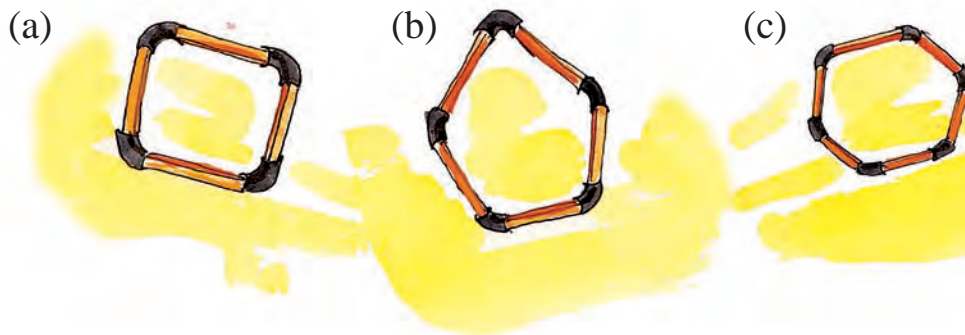
ii. Cut small pieces of the tube (about 1 cm long).

iii. Push two match sticks into each end of a tube piece.



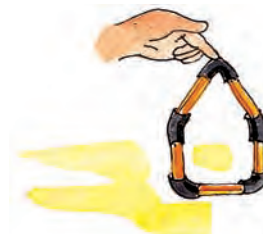
iv. Add more matchsticks to form a triangle.

Now make these 4, 5, 6 sided shapes by using tube pieces and matchsticks.



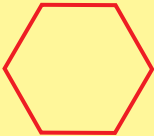
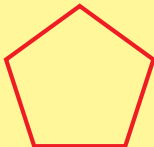
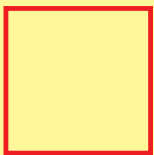
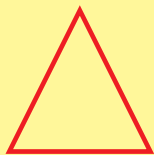
- ❖ Find out how many angles are there in each of these shapes. Mark them.

Now push each shape downwards with the tip of your finger?





❖ Find out and write your results in the table given.

Shape	Change in angle Yes/ no
	
	
	
	



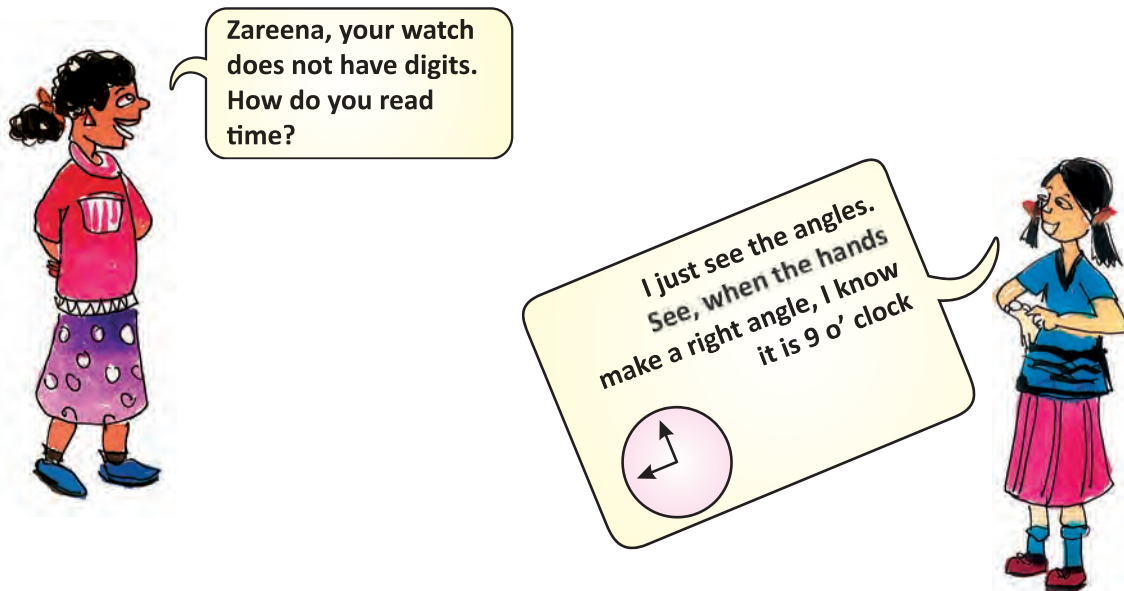
## Shapes and Towers

Look for triangles in the pictures below.



- ❖ From the activity 'Changing Shapes' can you guess why triangles are used in these towers, bridges etc?
- ❖ Look around and find out more places where triangles are used.

## Angle and Time





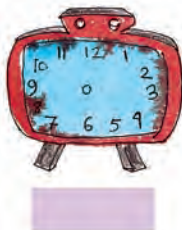
- ❖ There are many times in a day when the hands of a clock make a right angle. Now you draw some more.



- ❖ Write what kind of angle is made by the hands at these times. Also write the time.



- ❖ Draw the hands of the clock when they make an angle which is less than right angle. Also write the time.

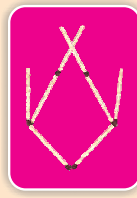


### Answers: Matchstick Puzzles (Page 5)

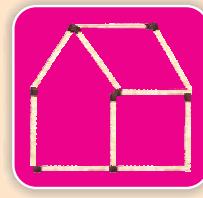
1.



2.

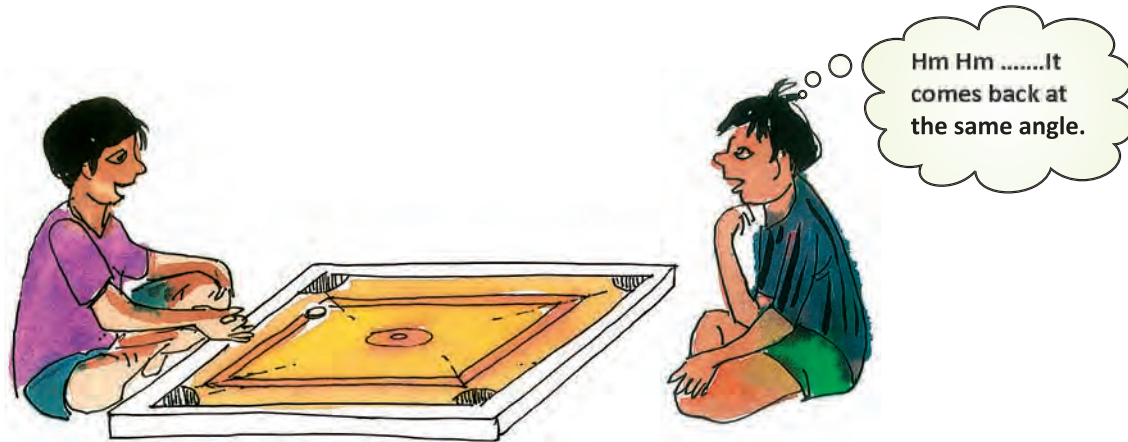


3.

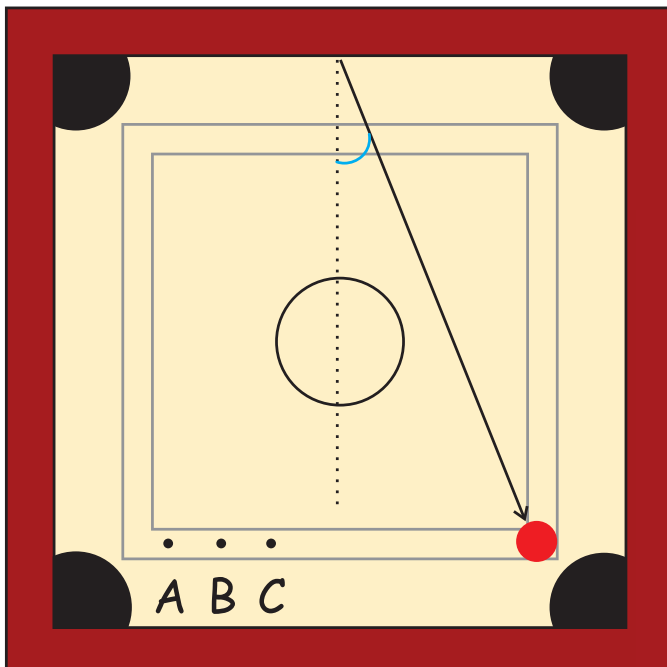


## Degree Clock

Amir and Kamran are playing carom board. Amir hit the sticker.



- ❖ In the picture three points A, B and C are shown. Draw a line to show from which point Kamran should hit to get the queen. \_\_\_\_



Fill in the blank spaces.

Q.NO.1. (a) An angle is measured in \_\_\_\_\_.

(b) Degree is written as \_\_\_\_\_.

(c) A \_\_\_\_\_ angle is called a right angle.

(d)  $\frac{1}{2}$  of a right angle is \_\_\_\_\_.

(e) 2 times of a right angle is equal to \_\_\_\_\_.

Q.NO.2. Fill in the blanks:

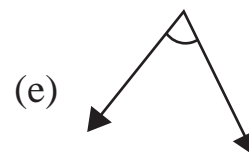
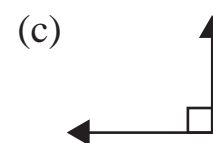
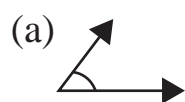
(a) An acute angle is more than  $0^\circ$  but less than \_\_\_\_\_

(b) A \_\_\_\_\_ angle is equal to  $90^\circ$ .

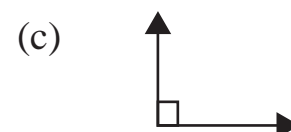
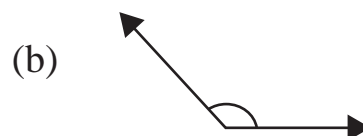
(c) An obtuse angle is more than  $90^\circ$  but less than \_\_\_\_\_.

(d) Two right angles are equal to a straight line then straight angles measures exactly \_\_\_\_\_.

Q.NO.3. Identify the following angles as acute, obtuse, right or straight angles.

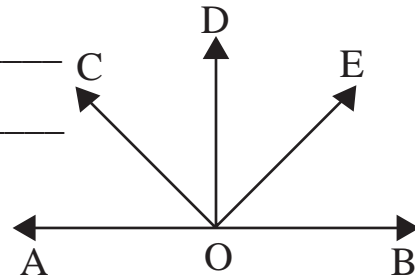


Q.NO.4. What is the measure of these angles?



Q.NO.5. Use D (Protractor) to measure the angles in the figure.

- (a)  $\angle AOC =$  \_\_\_\_\_ (b)  $\angle AOE =$  \_\_\_\_\_  
 (c)  $\angle COD =$  \_\_\_\_\_ (d)  $\angle BOE =$  \_\_\_\_\_  
 (e)  $\angle BOC =$  \_\_\_\_\_



Q. No 6 Construct the following angles with the help of your protractor.

- (a)  $50^\circ$  (b)  $120^\circ$  (c)  $90^\circ$  (d)  $60^\circ$  (e)  $45^\circ$  (f)  $160^\circ$

### Answers:

Q.NO.1:-

- (a) Degree (b)  $0^\circ$  (c)  $90^\circ$  (d)  $45^\circ$  (e)  $180^\circ$

Q.NO.2:-

- (a)  $90^\circ$  (b) Right angle (c)  $180^\circ$  (d)  $180^\circ$

Q.NO.3:-

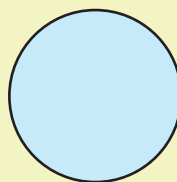
- (a) Acute angle (b) Obtuse angle  
 (c) Right angle (d) Straight angle  
 (e) Right angle

Q.NO.4:-

- (a) Less than a Right angle (b) Greater than a Right angle  
 (c) Right angle

**Activity:****Making a Degree Clock**

1. Cut a circle out of paper.



2. Fold it into half.



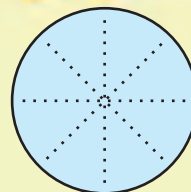
3. Fold it once again in to a quarter



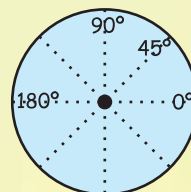
4. Fold in once more.



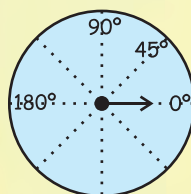
5. Open the paper. You will see lines like this.



6. Now mark  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$  and  $180^\circ$  as shown.

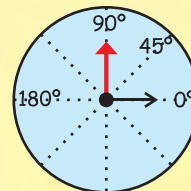


7. Paste it on an old card.



8. From the centre draw one hand.

9. Make a red hand with a thick paper and fix it to the centre with a drawing pin, so that it is free to move.



You degree clock is ready.

❖ Use your degree clock to measure the right angle of your pencil box. \_\_\_\_\_ is the measure of the right angle.

❖ Can you guess how many degrees is the angle which is \_\_\_\_

❖  $\frac{1}{2}$  of a right angle \_\_\_\_\_

❖  $\frac{1}{3}$  of a right angle \_\_\_\_\_



- ❖ 2 times of a right angle \_\_\_\_\_
- ❖ Measure the angle from where Junaid should hit the striker on page 15.

### Angles in a Paper Aeroplane

1. Take a square sheet of paper.



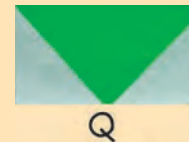
2. Fold it in half and open it.



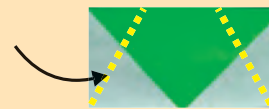
3. Fold the corners to the centre. Your paper looks like this.



4. Fold the green triangle such that P touches Q.



5. Fold the top two corners of this rectangle along the dotted lines.



6. Your paper will look like this. There is a small triangle in the picture which has to be folded up.



7. Turn it over and fold it in half along the dotted line.



8. Now, to make a wing fold the yellow edge over the red edge.



9. Turn it and do the same on the other side as well.



Your plane is ready to fly. How well does it fly?

- ❖ Find the angles of  $45^\circ$  and  $90^\circ$  when you open your plane.

## Angles With Yoga

Umar is doing Yoga. These are the pictures of different 'Asanas' he does everyday.



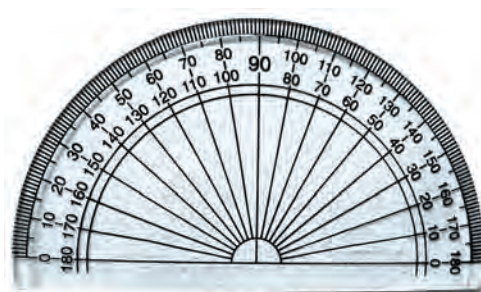
- ❖ Measure as many angles as you can make by different parts of the body while doing 'Asanas'.

## The D Game

You can play the 'D' game with your friends. You draw an angle. Your friend will guess the measure of that angle. Then you use your 'D' to measure it. The difference between the measured angle and the guess will be your friends score. The one with the lowest score will be the winner.

## Come on, Play!

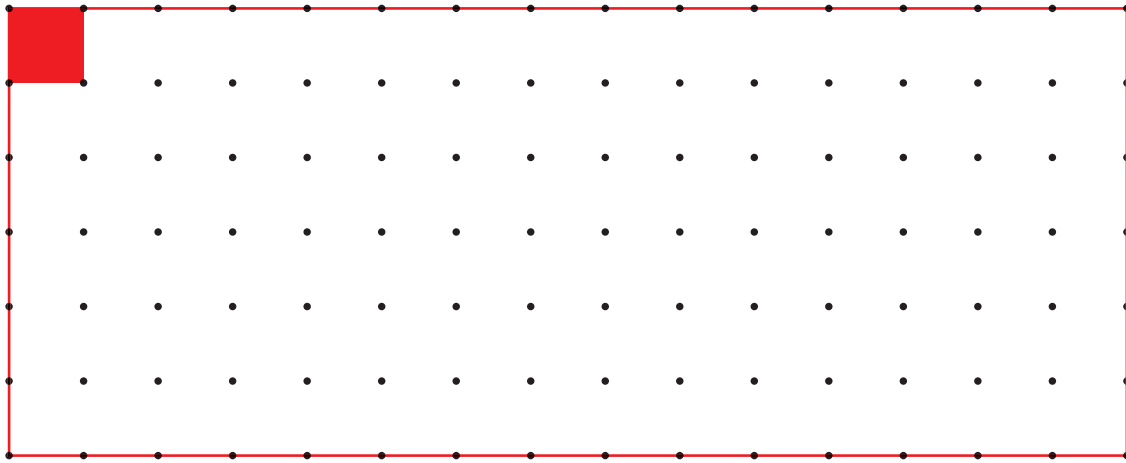
Draw Angle	Guess	Measure	Score



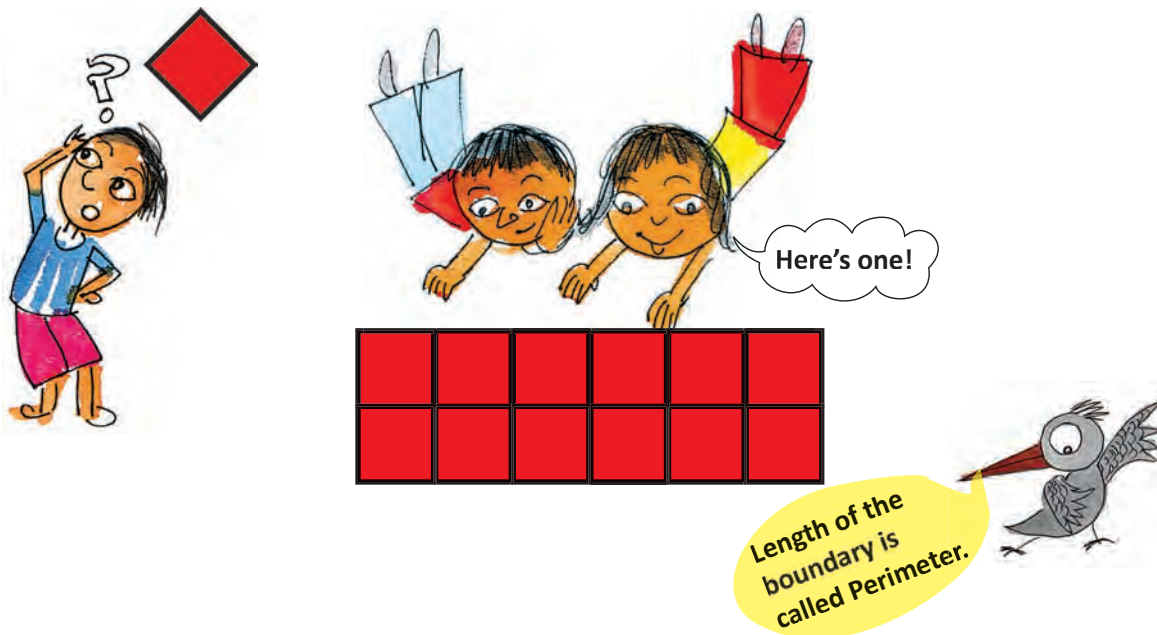
You can find this 'D' in your geometry box. Measure the angle on my head fan.

# How Many Squares?

## Chapter 2



- ❖ Measures the side of the red square on the dotted sheet. Draw here as many rectangles as possible using 12 such squares.
- ❖ How many rectangles could you make? \_\_\_\_\_

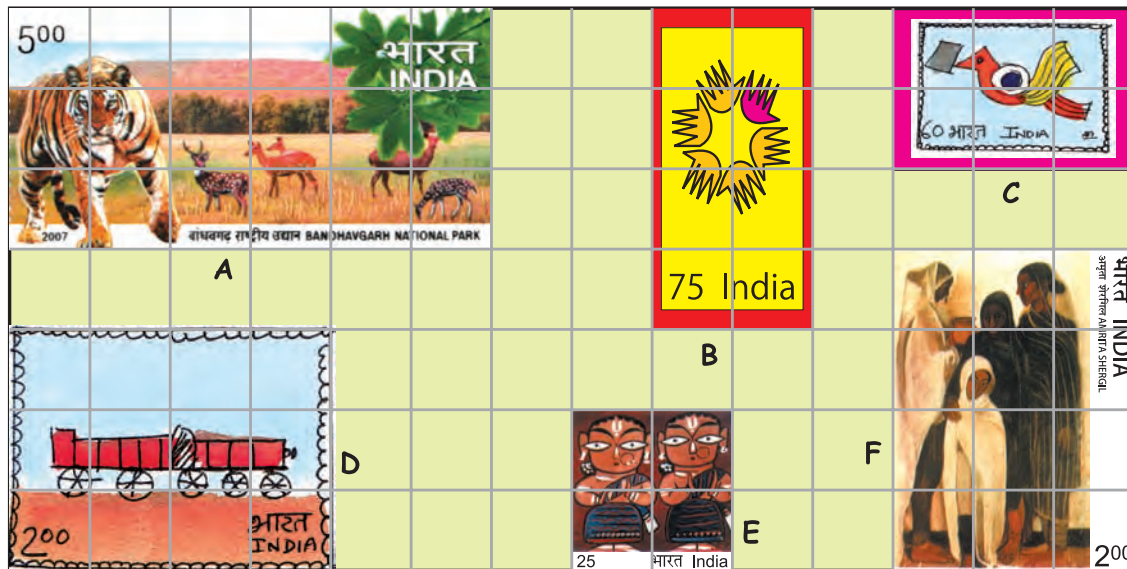


Each rectangle is made out of 12 equal squares, so all have the same area, but the length of the boundary will be different.

- ❖ Which of these rectangles has the longest perimeter?
- ❖ Which of these rectangles has the smallest perimeter?



## Measure Stamps



Look at these interesting stamps.

- a. How many squares of one centimeter side does stamp A cover? \_\_\_\_\_

And stamp B? \_\_\_\_\_

- b. Which stamp has the biggest area?

How many squares of side 1 cm does this stamp cover?

How much is the area of the biggest stamp? \_\_\_\_\_ square cm.

- c. Which two stamps have the same area? \_\_\_\_\_

How much is the area of each of these stamps? \_\_\_\_\_ square cm.

- d. The area of the smallest stamp is \_\_\_\_\_ square cm.

The difference between the area of the smallest and biggest stamp is \_\_\_\_\_ square cm.

Stamp D Covers 12 squares. Each square is of side 1 cm. so the area of stamp D is 12 square cm.



Collect some old stamps. Place them on the square grid and their area and find their perimeter.

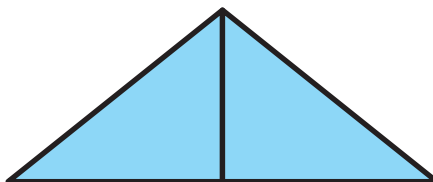
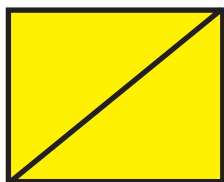
## Guess



- Which has the bigger area — one of your footprints or the page of this book?
- Which has the smaller area—two five-rupee notes together or a hundred-rupee note?



- Look at a 10 rupee-note. Is its area more than hundred square cm?
- Is the area of the blue shape more than the area of the yellow shape? Why?



- Is the perimeter of the yellow shape more than the perimeter of the blue shape? Why?

## How Big is My Hand?

Trace your hand on the squared sheet on the next page.



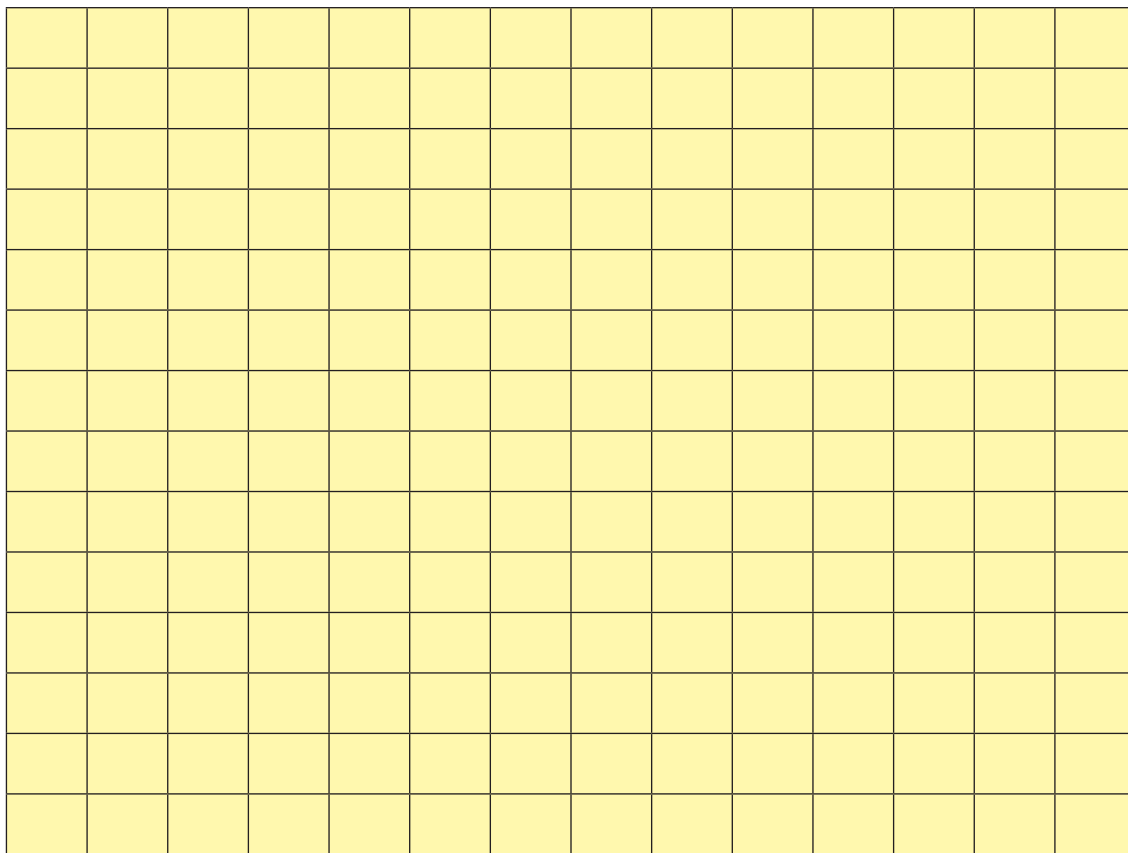
How will you decide whose hand is bigger - your hand or your friend's hand?

What is the area of your hand?  
\_\_\_\_\_ square cm.

What is the area of your friend's hand? \_\_\_\_\_ square cm.







## My Foot Prints

- ❖ Whose Foot Prints is larger \_\_\_\_\_ yours or your friend's?
- ❖ How will you decide?

### Discuss.

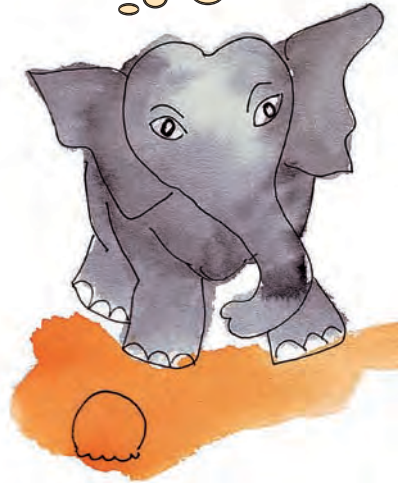
- ❖ Is the area of both your footprints the same?



My skin has many many folds.  
So I have a big area! This way  
the air all over me keeps me  
cool.

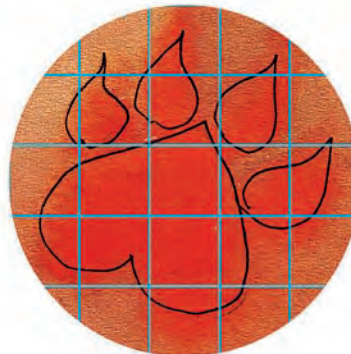
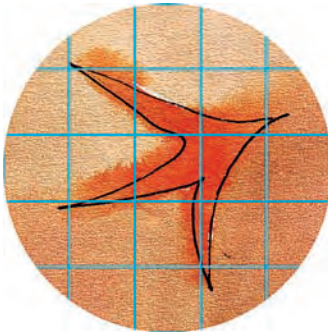


What is the area  
of my footprint?



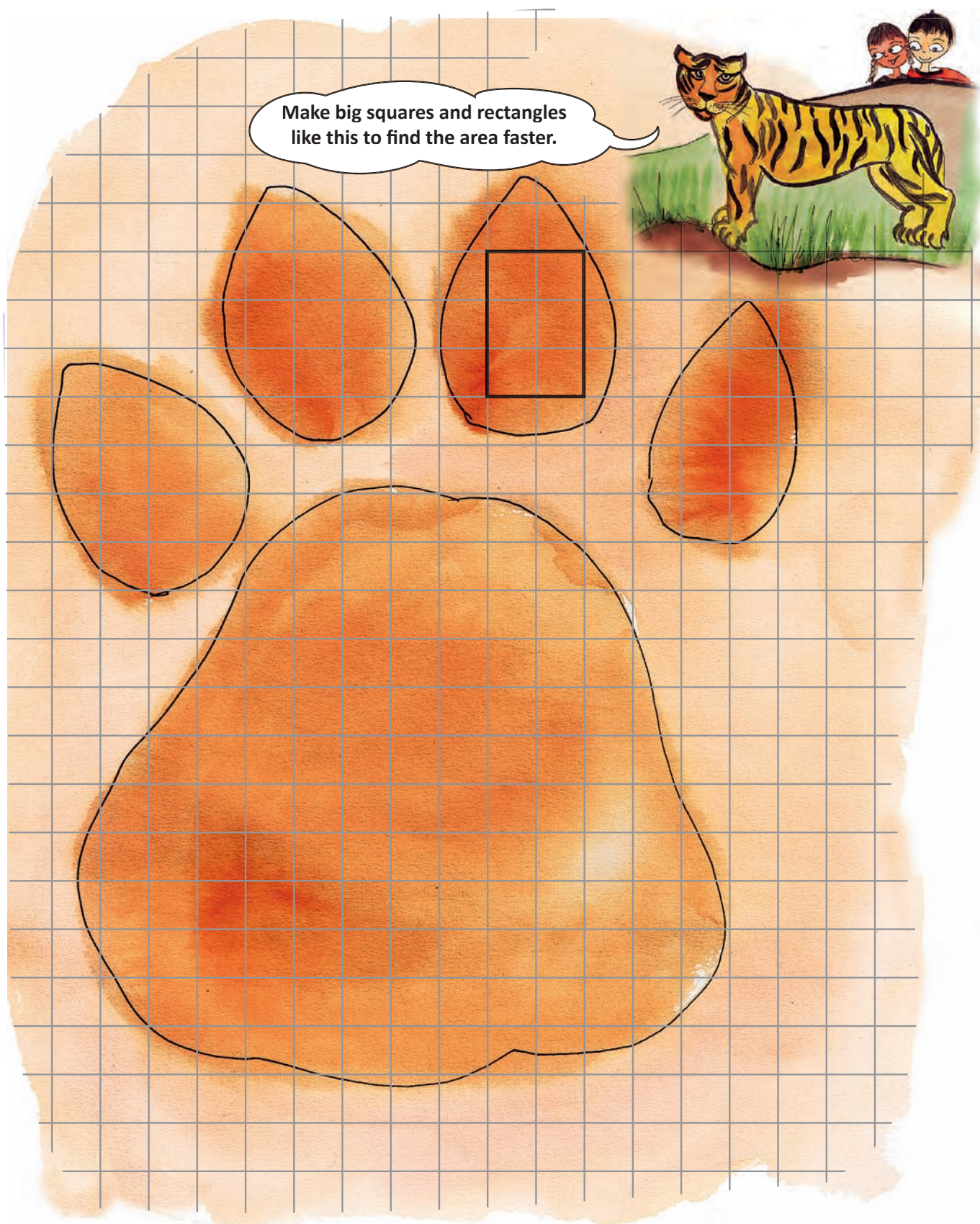
- ❖ Guess which animal's footprint will have the same area as yours. Discuss.
- ❖ Here are some footprints of animals in actual sizes. Guess the area of their footprints.

Hen



Dog







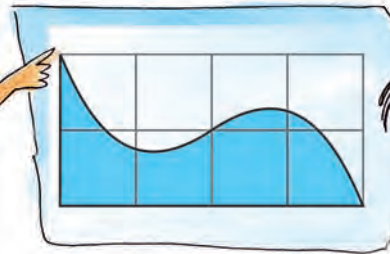
## How many squares in Me?

What is the area of the triangle?



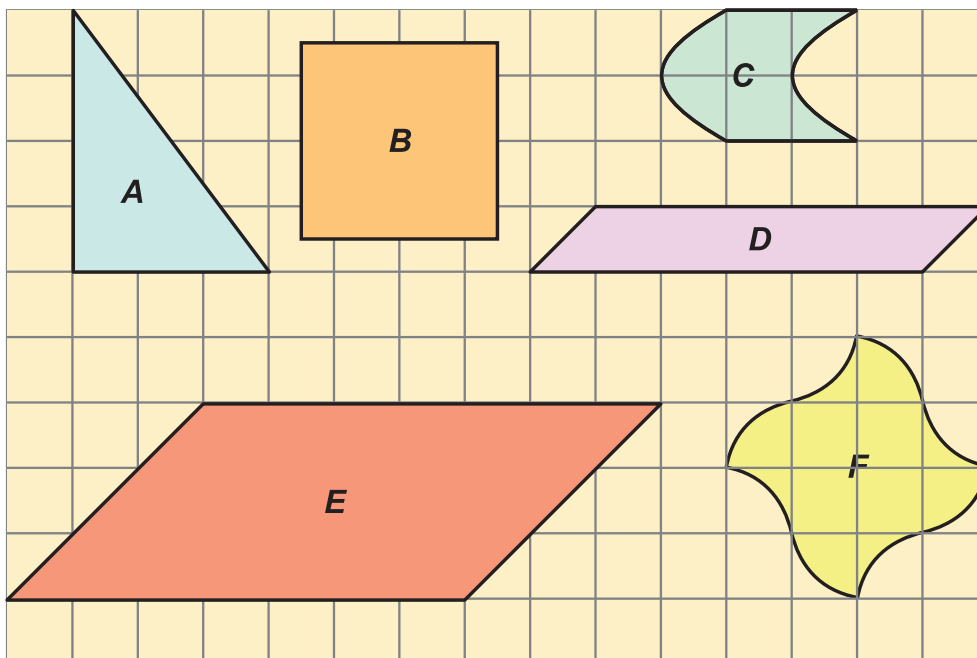
The triangle is half the rectangle of area 2 square cm. so its area is \_\_\_\_ square cm.

Is this shape half of the big rectangle?



Hmmm..... So its area is \_\_\_\_ square cm.

❖ Write the area (in square cm) of the shapes below.

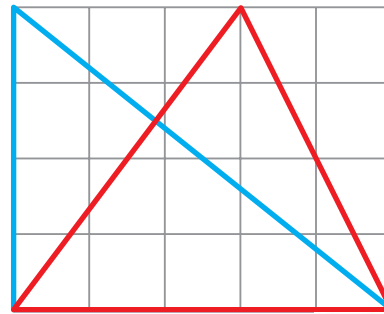


## Try Triangles

Both the big triangles in this rectangle have the same area.



Sakeena



But these look different.



Suhail

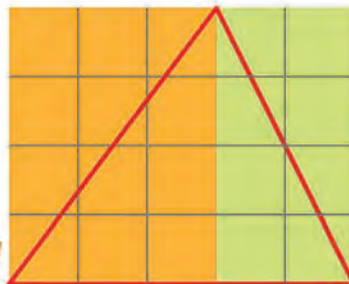
The blue triangle is half of the big rectangle. Area of the big rectangle is 20 square cm. So the area of the blue triangle is \_\_\_\_\_ square cm.



And what about the red triangle?



Ah, in it there are two halves of two different rectangles!



Now you find the area of the two rectangles Suhail is talking about. What is the area of the red triangle? Explain.





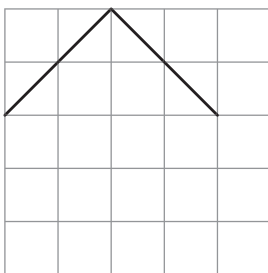


Yes you are right. And you know what!! You can draw many more triangles of area 10 square cm in this rectangle. Try drawing them.

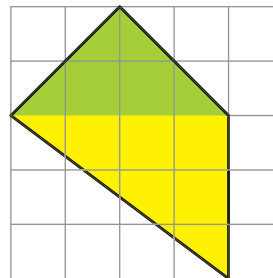
Help Suhail in finding some more such triangles. Draw at least 5 more.

## Complete the shape

Tabassum drew two sides of shape. She asked Asif to complete the shape with two more sides, So that its area is 10 square cm.



He completed the shape like this

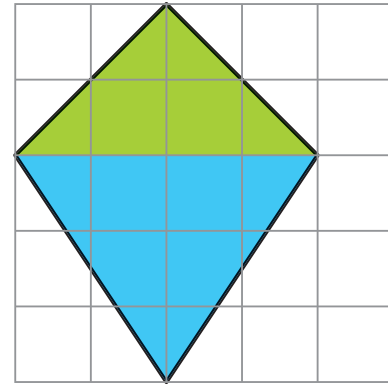


How did you do this?

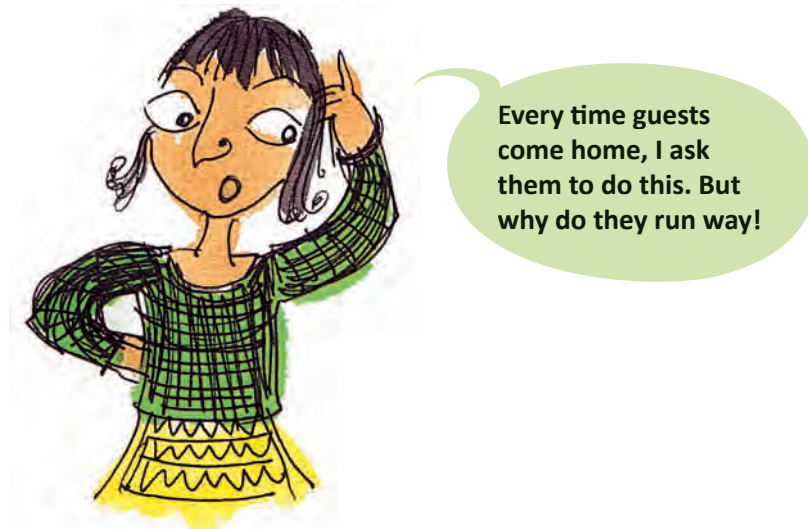
Oh that's easy! If you look at the green area it is 4 square cm. Below it is the yellow area of 6 square cm. so the area of my shape is 10 square cm.



- ❖ Is he Correct? Discuss.
- ❖ Explain how the green area is 4 square cm and the yellow area is 6 square cm.



- ❖ Is Tabassum correct? How much is the blue area? Explain.
- ❖ Can you think of some other ways of completing the shape?
- ❖ Try some other ways yourself.
- ❖ Now ask your friends at home to solve these.



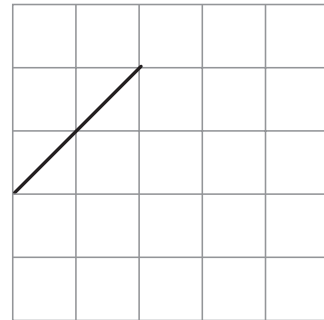


## Practice Time



1. This is one of the sides of a shape.

Complete the shape so that its area is 4 square cm.

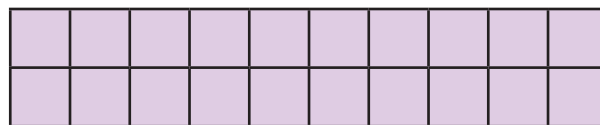


2. Two sides of a shape are drawn here.

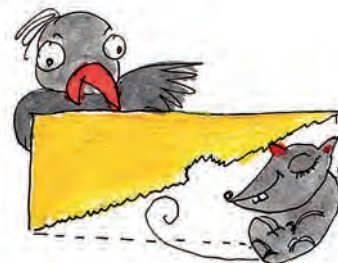
Complete the shape by drawing two more sides so that its area is less than 2 square cm.



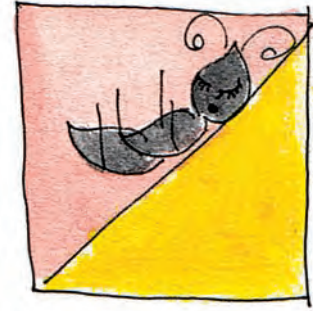
3. Here is a rectangle of area 20 square cm.



- Draw one straight line in this rectangle to divide it into two equal triangles. What is the area of each of the triangles?
- Draw one straight line in this rectangle to divide it into two equal rectangles. What is the area of each of the smaller rectangles?
- Draw two straight lines in this rectangle to divide it into one rectangle and two equal triangles.



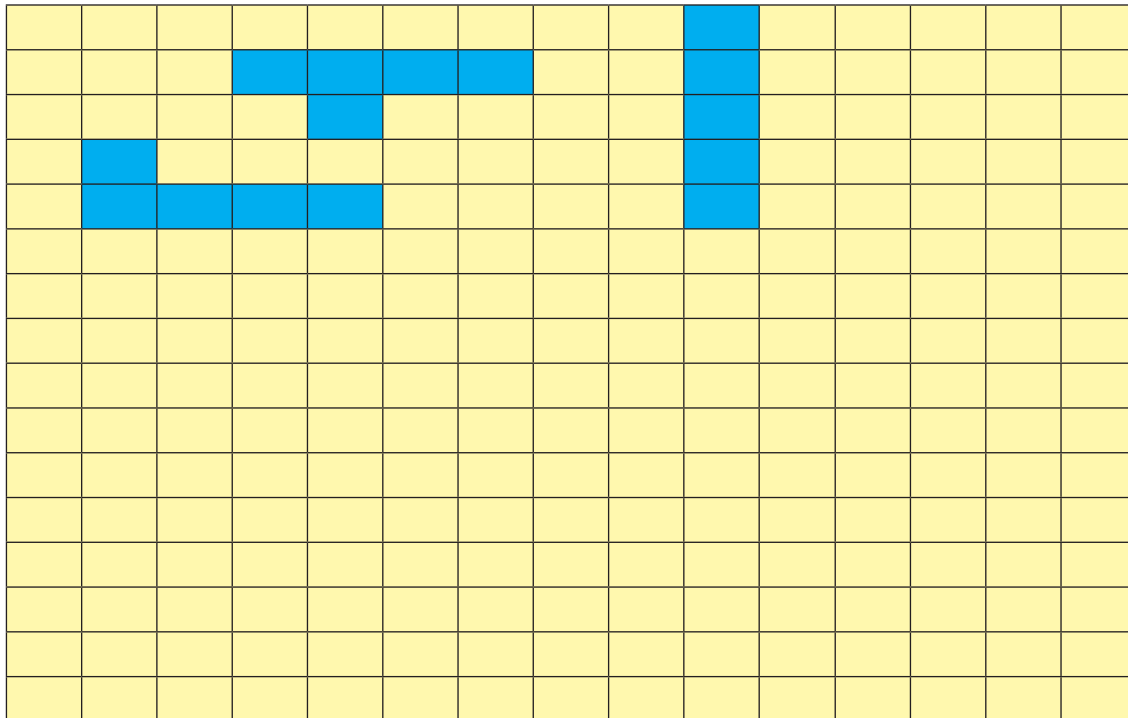
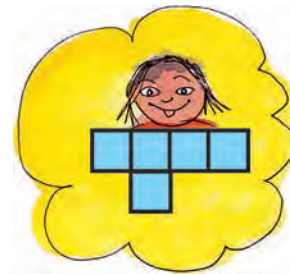
- ❖ What is the area of the rectangle?
- ❖ What is the area of each of the triangles?



### Puzzles with Five Squares

Measure the side of a small square on the squared paper. Make as many shapes as possible using 5 such squares.

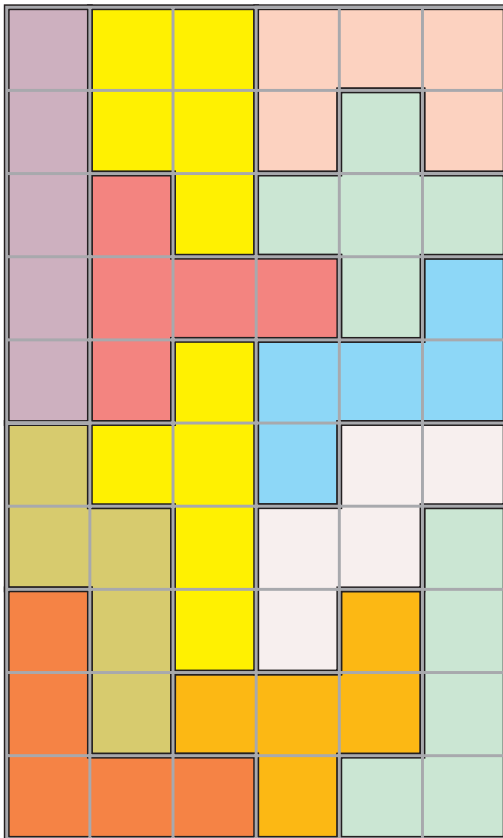
Three are drawn for you.





- How many different shapes can you draw? \_\_\_\_\_
- Which shape has the longest perimeter? How much? \_\_\_\_\_ cm.
- Which shape has the shortest perimeter? How much? \_\_\_\_\_ cm.
- What is the area of the shapes? \_\_\_\_\_ square cm. That's simple!

Did you get all the 12 shapes using 5 squares?



All 12 shapes are arranged here to make a rectangle. This is a  $10 \times 6$  rectangle as there are 10 rows and 6 columns. You will be surprised to know that there are more than 2000 ways in which these shapes make a  $10 \times 6$  rectangle.

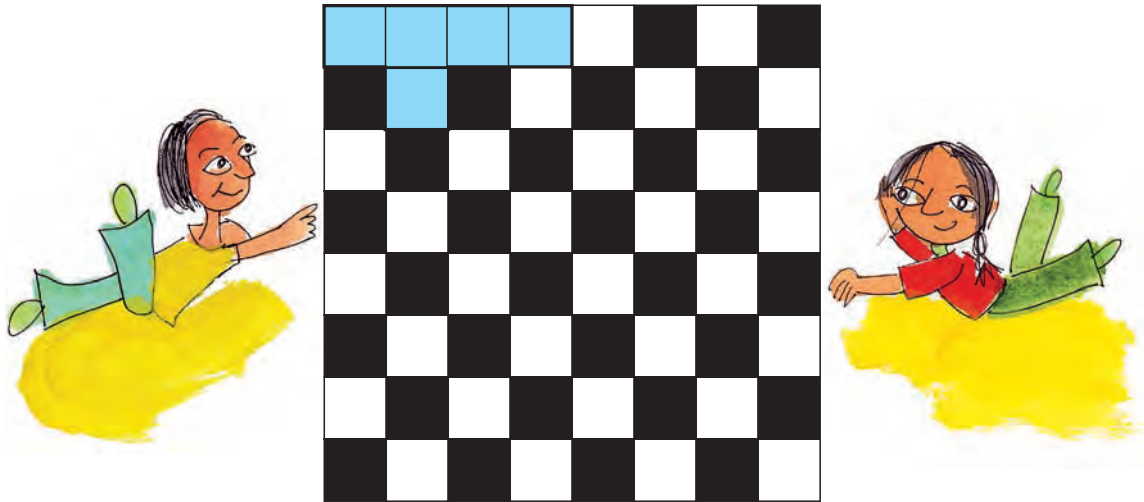


Draw all the 12 shapes on a sheet of cardboard and cut them.

Try to arrange your 12 shapes in some other way to make a  $10 \times 6$  rectangle. Could you do it?

## Game Time

Here it is a chessboard. Play this game with your partner, with one set of 12 shapes.



The first player picks one shape from the set and puts it on the board covering any five squares.

The other player picks another shape and puts it on the board, but it must not overlap the first shape.

Keep taking turns until one of you can't go any further.

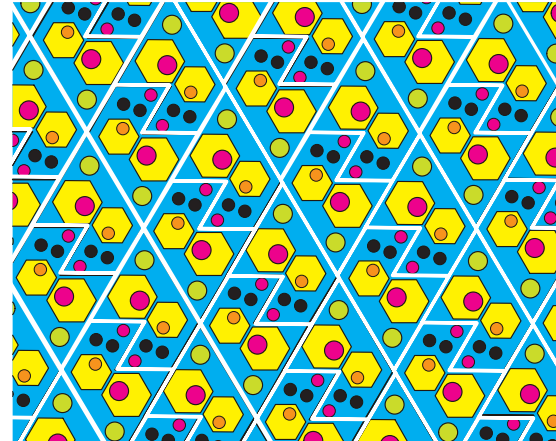
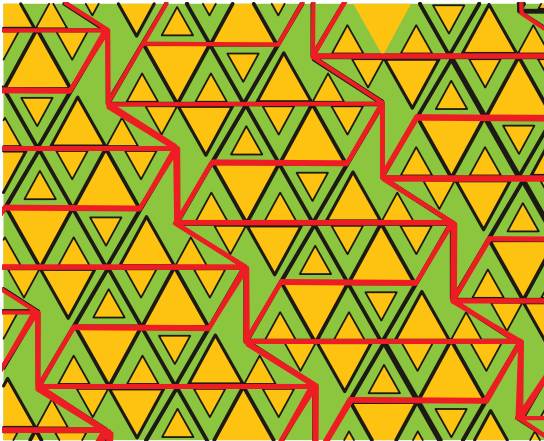
Whoever puts the last piece wins!

## Make Your Own Tile

Choose the correct tile which could be repeated to make a pattern so that there are no gaps left.

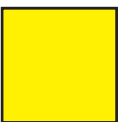
Sumaria went to a shop and was surprised to see the different designs of tiles on the floor. Aren't these beautiful!

Can you find the tile which is repeated to make each of these floor patterns? Circle a tile in each pattern.

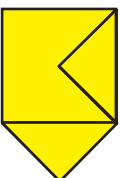
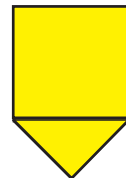


After looking at the patterns Sumaira wanted to make her own yellow tile. You too make a tile this way.

Step 1: Take a piece of cardboard or thick paper. Draw a square of side 3 cm on it.



Step 2: Draw a triangle on any one of the sides of this square.

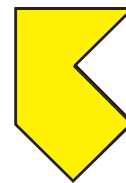


Step 3: Draw another triangle of the same size on another side the square. But this time draw it inside the square.



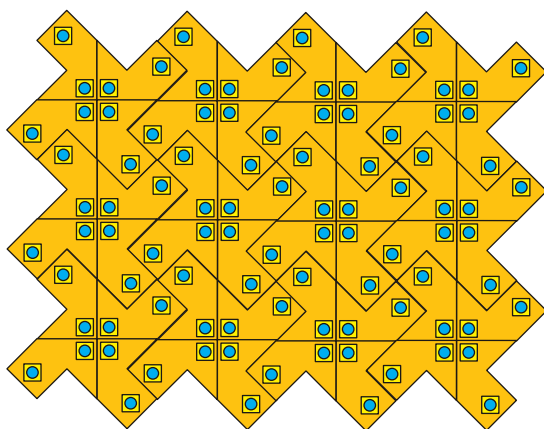
Step 4: Cut this shape from the cardboard. Your tile is ready!

What is its area?



Make a pattern using your tile. Trace the shape to repeat it on a page, but remember there must be no gaps between them.

Sumaira made a pattern using her yellow tiles. (You know the area of her tile.)



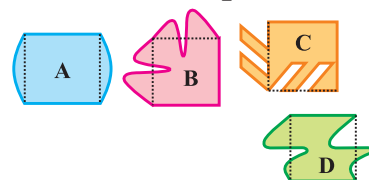
### Answers these-

- ❖ How many tiles has she used?
- ❖ What is the area of the floor pattern Sumaira has made here?

### Practice Time

Sumaira tried to make some other tiles. She started with a square of 2 cm side and made shapes like these.

Look at these carefully and find out:



- ❖ Which of these shapes will tile a floor (with out any gaps)? Discuss. What is the area of these shapes?
- ❖ Make designs in your copy by tilling those shapes.
- ❖ Now you create your own new tiles out of a square. Can you do the same with a triangle? Try doing it.