Chapter 1

Shapes Around Us

0433CH01



Diksha wanted to go to a big city during her summer holidays. Her father took her to Delhi and they visited many old and new interesting monuments like the India Gate, Qutub Minar, Safdarjung Tomb, Akshardham, the National Museum, Jantar Mantar and Sansad Bhawan.



Now she is trying to make a model of India Gate using her wooden blocks.





Try to make a model of the buildings shown here using blocks.

1. What parts of the building have you shown in your model (for example, roof, pillars, base, etc.)?
2. Why did you select these parts?
3. What shapes will model these parts well?_____
4. How is your model similar to the picture of the real building? _____
5. How is it different from the real building? _____

Discussion: What would happen if you removed one piece of your model?

- Would the model still look like the original building?
- In what ways could you make the model even better?

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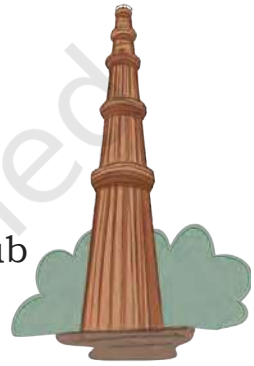
Project Work

Encourage learners to observe a street carefully and make a model showing the main buildings on the street.





I have made something. Look at my Qutub Minar.



Do you think it looks like the Qutub Minar?.....

What shape would you use if you made a model of the Qutub Minar? Why?.....

How many such shapes will you use? .....

Do you know: The Qutub Minar is a World Heritage site and the tallest building made up of bricks. It has 5 storeys and 379 stairs.



Earlier, people made buildings with clay bricks, stone blocks or wood. Today we also use concrete blocks, hollow blocks, etc.

What is common to all of these bricks? .....



Note for Teachers: Ask learners to collect different boxes, bottles, cans, coconut shells, etc., to model the given buildings.



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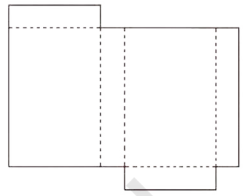
Craft



1. Make a sphere-like shape with paper strips.

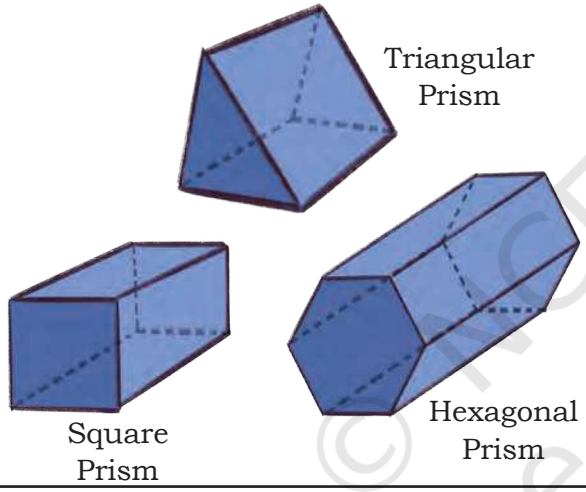
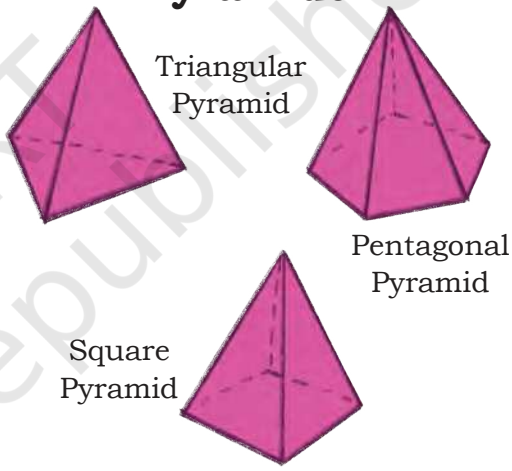


Diksha has folded open and flattened a box to see what an open box looks like. This is called the *net* of the box. If you fold along the dotted lines, you will get the box back.



Net of a box

2. Use the *nets* given at the end of the book to make the models shown below.

Prisms	**Pyramids**
	
What shape of face is common to all the prisms? _____ What other shapes do these prisms have? _____ How many such faces each? _____	What shape of face is common to all the pyramids? _____ All the triangular faces meet at _____ point. Identify any other shape in each of the pyramids _____

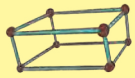
Is a cube also a prism?

What is the difference between a prism and a pyramid? Discuss.

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3. Now try to make the above shapes using straws and plasticine/ thread and fill in the table.

Shapes	Number of faces (F)	Number of corners (V)	Number of edges (E)
Cube/Square Prism 			
Cuboid/Rectangular Prism 			
Triangular Pyramid 			
Square Pyramid 			
Triangular Prism 			

Identify any relationship that you may find between the number of faces (F), edges (E), and corners (V). Calculate F+V–E in each case. What do you notice?

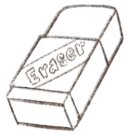
Sort 3D shapes by the number of flat faces. Write their names here.						
Number of faces	1 flat face	2 flat faces	4 flat faces	5 flat faces	6 flat faces	8 flat faces
Name of the shape						

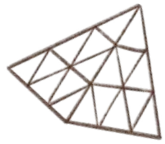
Can you construct a 3D shape with 3 flat faces?

Now sort 3D shapes by the number of straight edges. Write their names here.				
Number of edges	6 straight edges	8 straight edges	9 straight edges	12 straight edges
Name of the shape				

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Let Us Observe



1. Take a die. Look at the face that has number 1. The face numbered 6 is opposite to the face numbered 1.



What is the face opposite to the



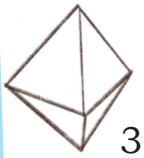
a) face numbered 2? .....

b) face numbered 3? .....

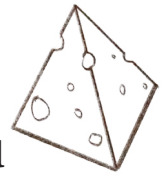


c) face numbered 4? .....

2. a) Which faces have common edges with the face numbered 1? .....

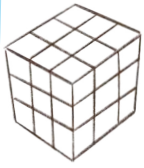


b) Which face has no common edge with the face numbered 1? .....



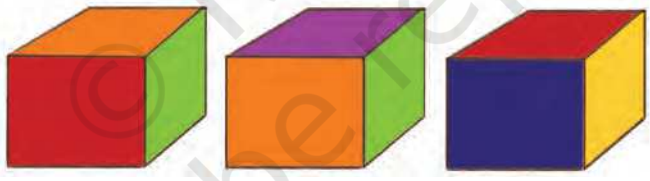
3. Look at three different views of the same cube.

a) What colour is the face that is opposite to the red face? .....



b) What colour is the face that is opposite to the yellow face? .....



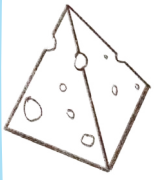




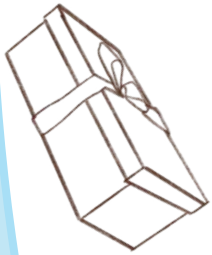


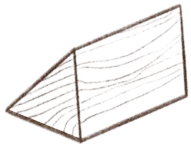
Follow these instructions for the shapes along the border.

1. Colour all shapes with a rectangular face in red.
2. Draw a smiley on shapes with a triangular face.
3. Draw a star on shapes with a curved face.
4. Colour all shapes with no corner in blue.
5. Circle the shapes that have the same opposite faces.



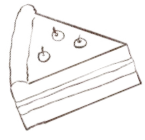












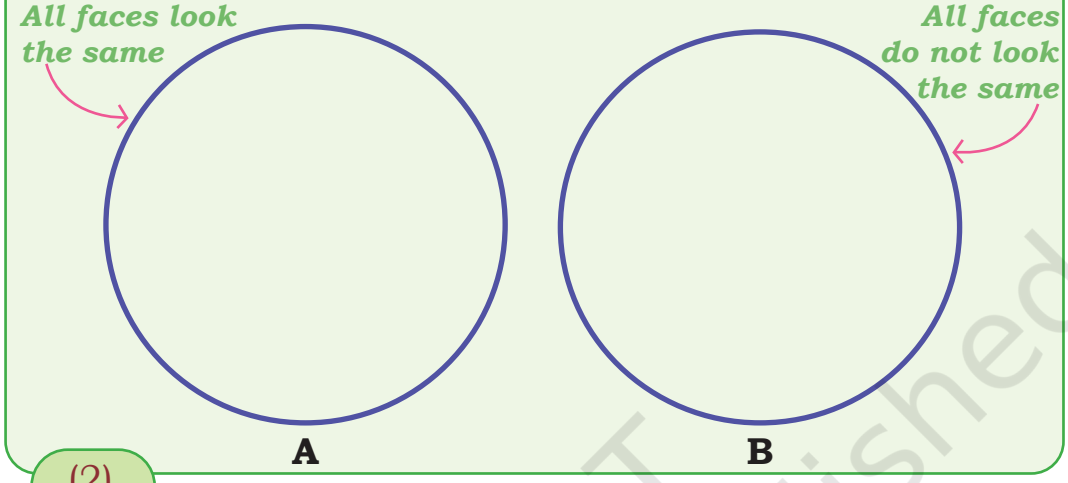
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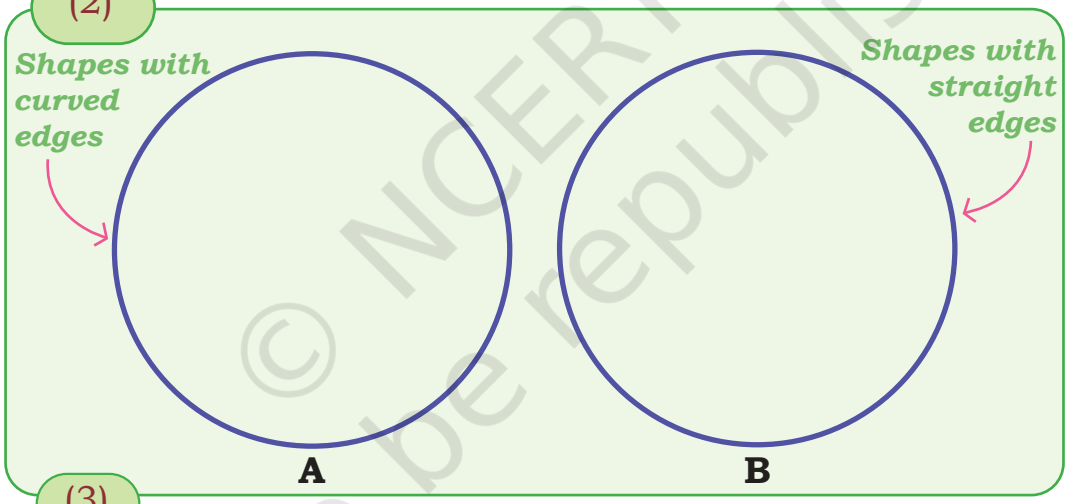
Sorting 3D Shapes

Write the names of 3D shapes in the correct places.

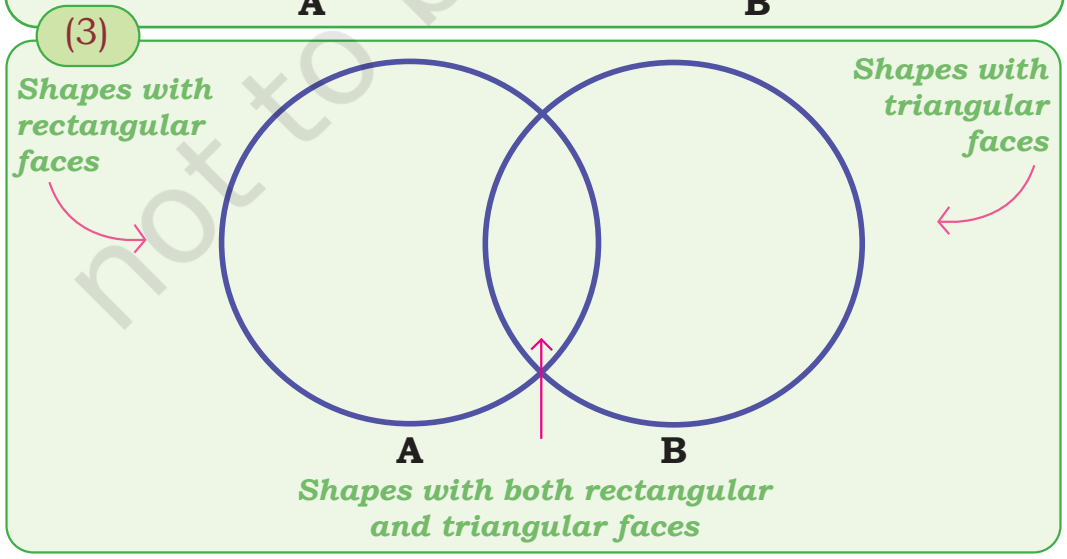
(1)



(2)



(3)



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In which circle did you write triangular prism and rectangular pyramid?

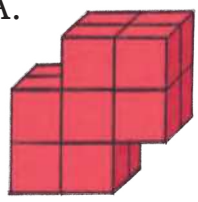
Let us sort shapes in another way.

Using circles like those on the previous page, can you sort shapes into the categories “Shapes with curved faces” and “Shapes with flat faces”?

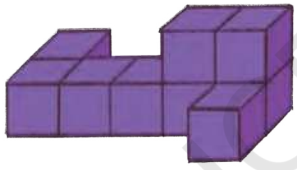
Build with Cubes

Build these models with the cubes from the *Jaadui Pitara Kit* or any other similar material.

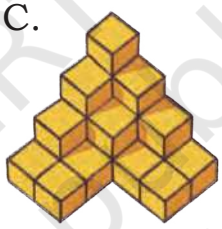
A.



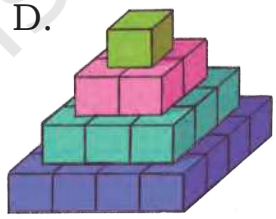
B.



C.

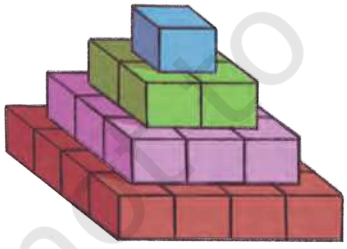


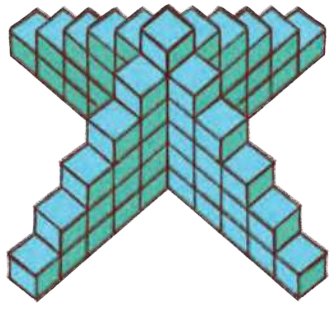
D.



Cube Towers

How many cubes are there in each of these cube towers?





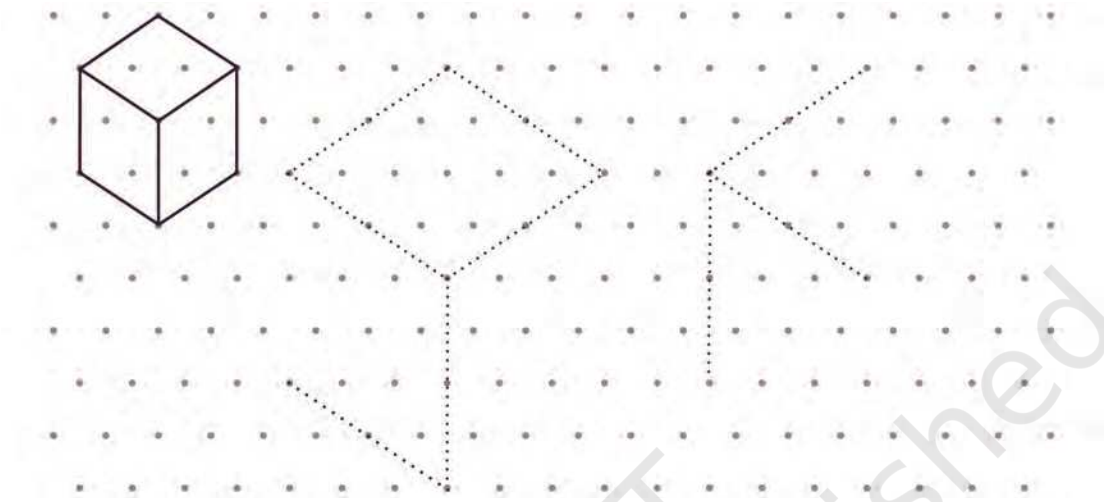
Note for Teachers: Use the available wooden, paper, and straw models. Discuss adjacent and opposite faces. Discuss shapes that fall into two sets. Let them make Venn diagrams (using circles like above) and write the names of these shapes.

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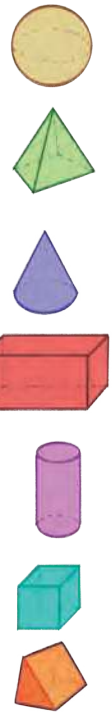
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Drawing Cubes on a Triangular Dot Paper

Can you complete the following cubes?



1. Match the pictures to the descriptions and name the shapes.



   a) I have 5 faces and 5 corners. I have 8 edges. 1 of my faces is a square and 4 of my faces are triangles.....

   b) I have 1 flat face, 1 curved face, and 1 edge.....

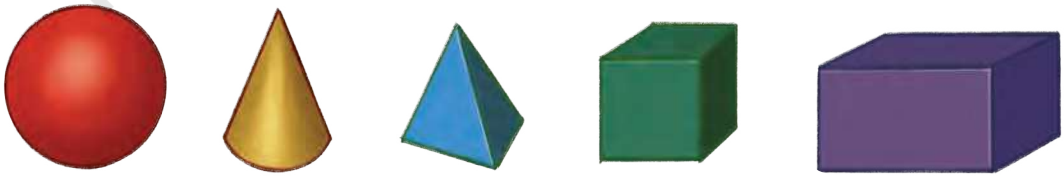
   c) I have 1 curved face. I have no edges or corners.....

   d) I have 2 flat faces, 1 curved face, and 2 edges. I have no corners.....

   e) I have 5 faces, 6 corners, and 9 edges, and 2 of my faces are triangles.....

   f) I have 6 faces, 12 edges, and 8 corners.....

2. Each one is different. How? Discuss.

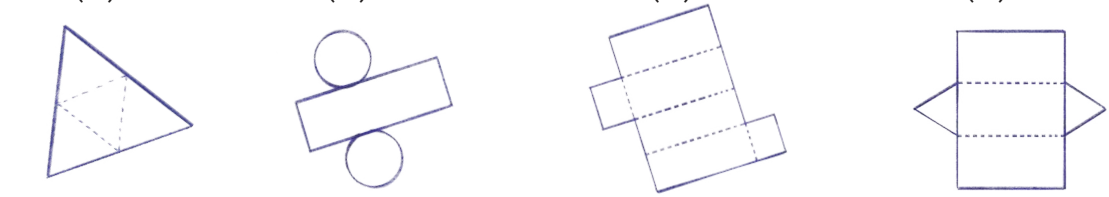


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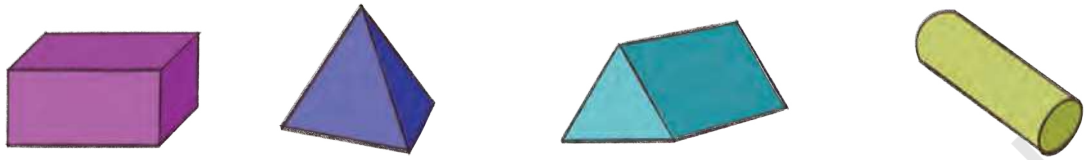
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3. Match the following nets to the appropriate solids given below.

(1) (2) (3) (4)

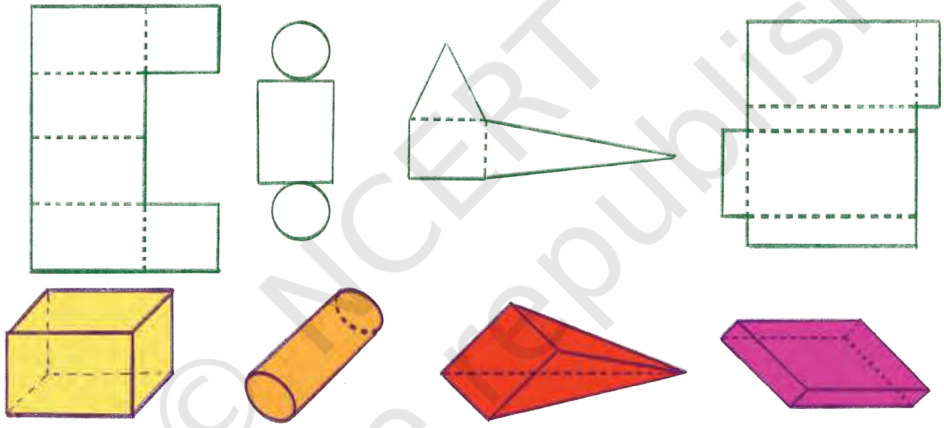


(a) (b) (c) (d)

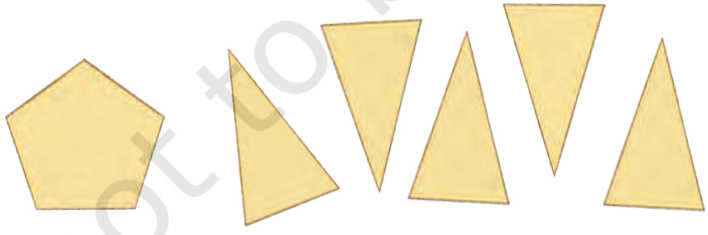


4. Which of these nets can be folded to make a solid of the kind given below?

A. B. C. D.

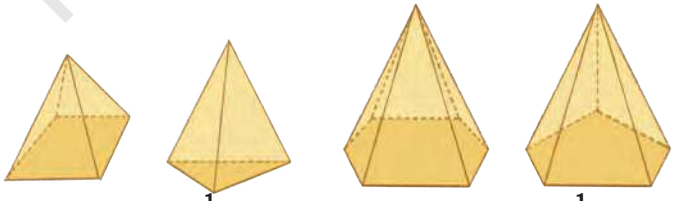


5. Nitesh cuts up a net on the folds. Here are its pieces.





Which solid has the above pieces in its net?

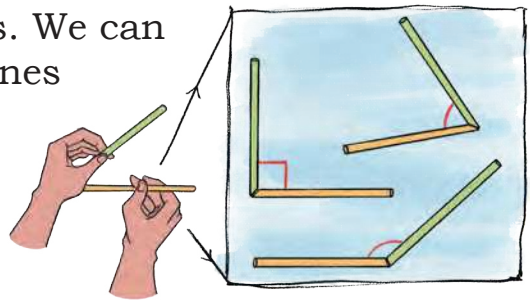


a. b. c. d.

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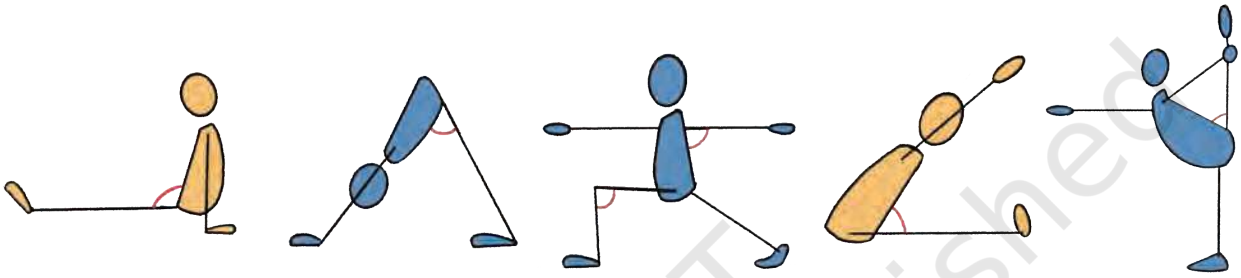
When Lines Meet

Isha made different corners with straws. We can say that the two straws are like two lines that meet at a point.

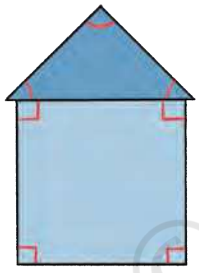


When two lines meet they create an angle.

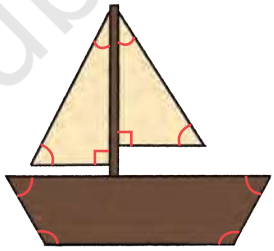
We see many angles in yoga postures.



There are 7 angles in this house drawing.



How many angles are there in this boat drawing?



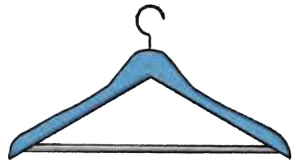
Let Us Do

1. Mark the angles in the following pictures.

a)



b)



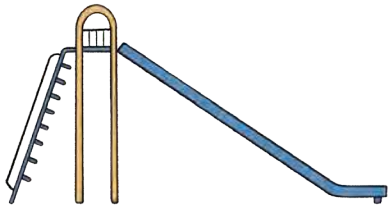
c)



d)



e)



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2. Where do you see angles in the classroom? Give a few examples.

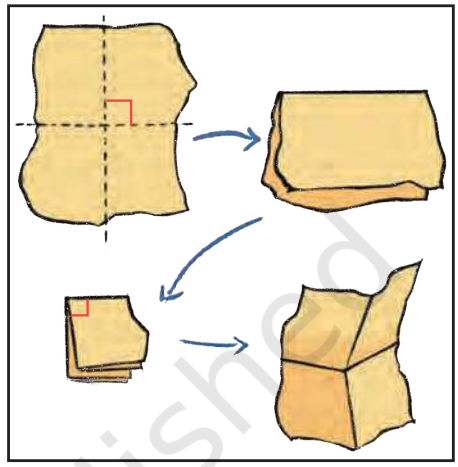
_____

_____

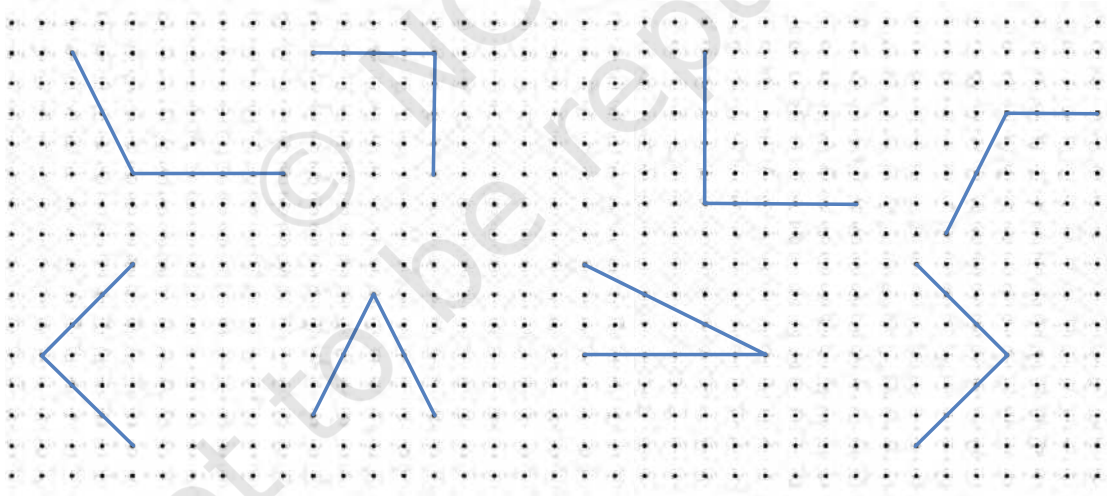
_____

Right Angles

Let's make a right angle with a piece of paper as shown.



Identify the angles that you think are right angles and circle them in the dot grid given below. Check using your right angle checker.



Check for right angles in a book, window, and any other object.

Write the names of objects where you find right angles.

_____

_____

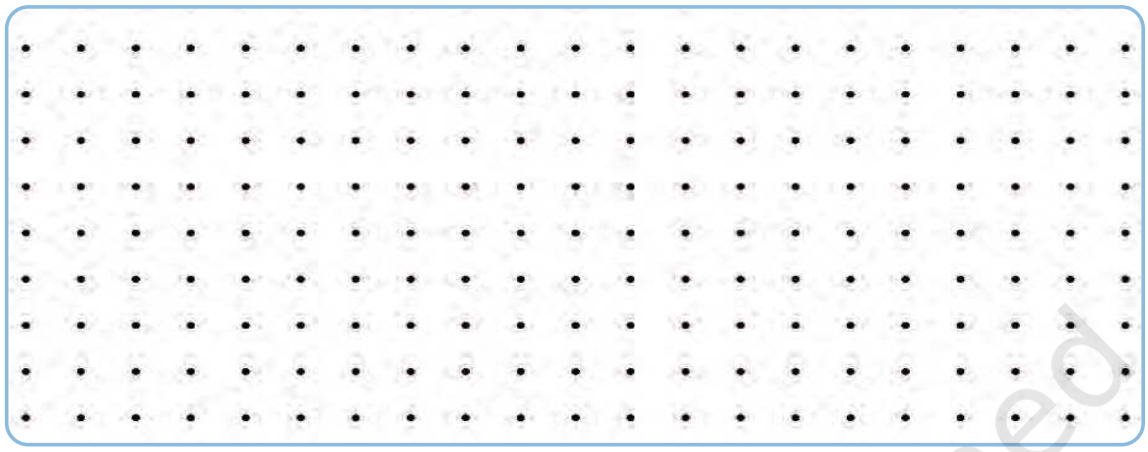
_____

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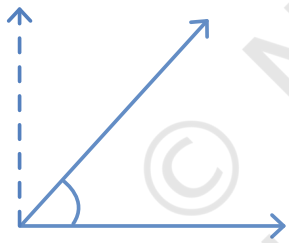
Let Us Do

1. Draw some right angles on the dot grid.

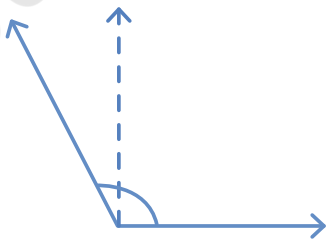


Acute and Obtuse Angles

Acute angles are less than a right angle.



Obtuse angles are more than a right angle.



Name some objects from your classroom which have an acute angle.

_____.

Name some objects from your classroom which have an obtuse angle.

_____.

Identify all angles in the following letters.

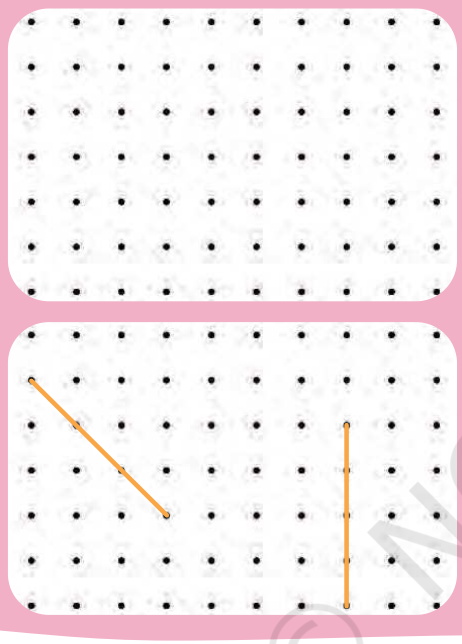


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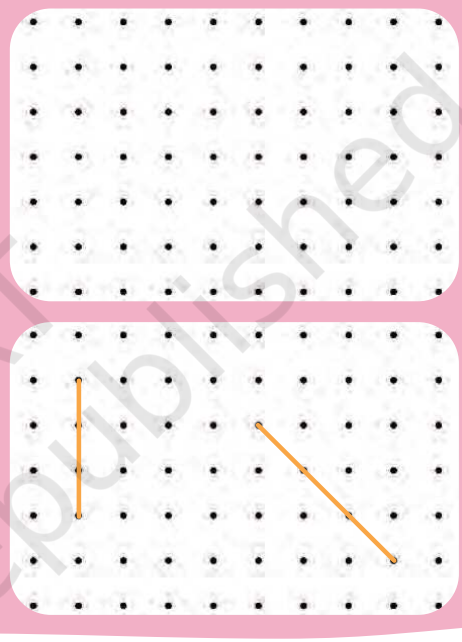
Let Us Do

1.

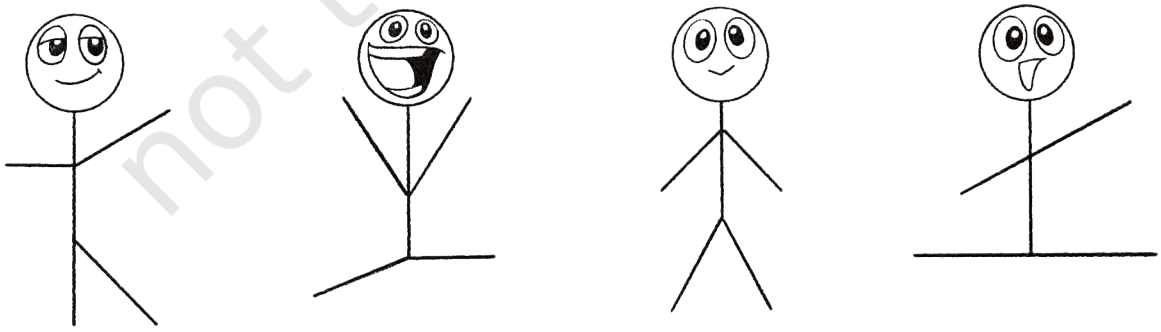
Draw some acute angles on the top grid. Draw a line to make an acute angle using each given line in the bottom grid.



Draw some obtuse angles on the top grid. Draw a line to make an obtuse angle using each given line in the bottom grid.



2. In the figures given below, mark the acute angles in red, right angles in green, and obtuse angles in blue.



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Shapes with Straws



Make a triangle with straws of different sizes and clay/ plasticine.

Does the shape of the triangle change if we gently push one of its sides?

Yes/No

Trace the triangles you made with the straws in your notebook.

What kinds of angles does a triangle have?

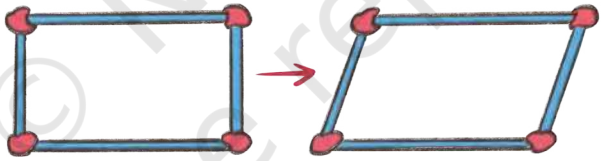


Make a rectangular shape with straws and clay.

What kinds of angles do you see in the rectangle?.....

Does the shape of the rectangle change if we gently push one of its sides?

Yes/No

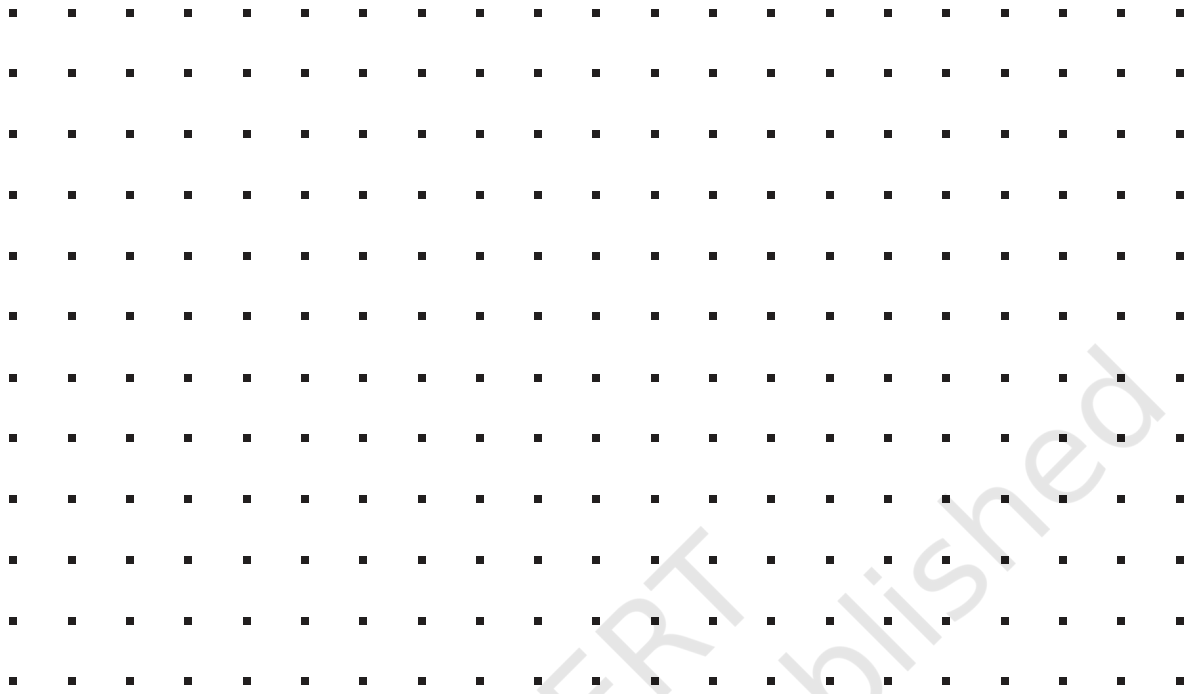


What has happened to the angles of the new shape?
Are they still right angles? What types of angles have been formed?
Similarly, push one side of a square.
Are they still right angles? What types of angles have been formed?
How are the angles of triangles and rectangles similar or different?

Note for Teachers: Help children to understand the rigidity of different shapes. The triangle is the most rigid shape, as it does not change its shape when pushed.

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Use the dot grid given below to draw several three- and four-sided shapes. Circle the shapes that have one or more right angles.



Discuss: What shapes did you make?
How many shapes have you made with
a) 1 right angle
b) 2 right angles
c) 3 right angles
d) all right angles

Here are some 4-sided shapes.
In what ways are rectangle and square different from these shapes?

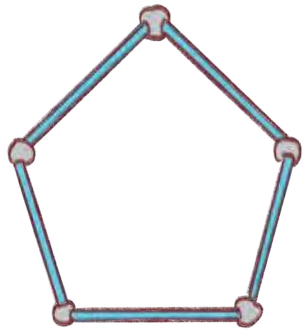


Note for Teachers: Discuss similarities and differences between a square and a rectangle. Provide experiences to observe squares as a special case of rectangles. Teachers can also provide more dot grids, if required.

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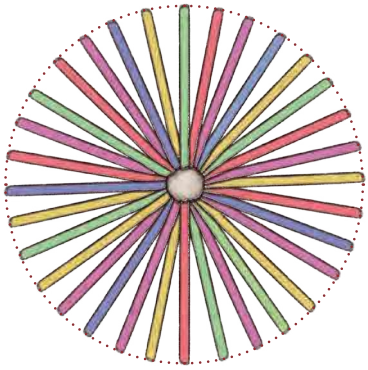
Try to make this 5-sided shape with all sides equal (Pentagon)



Are these right angles?

Does the shape of the pentagon change if we gently push one of its sides. Yes/No

How does this change the angles?



Can you make a circle using straws?

Look at the picture. The lengths of the straws in this picture are .....

(Equal/Unequal)

What will happen if we take straws of unequal lengths?

Let Us Make

Can you use a scale to draw a circular shape? Let us see.

Mark a point A.

Draw many points that are at an equal distance from point A.

Connect the dots freehand. What do you get?

.....

The point A is the centre and the line from the centre to the border of the circle is the radius.



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Amazing Circles

a) Take a piece of circular paper.

b) Fold your paper in half and crease it well.

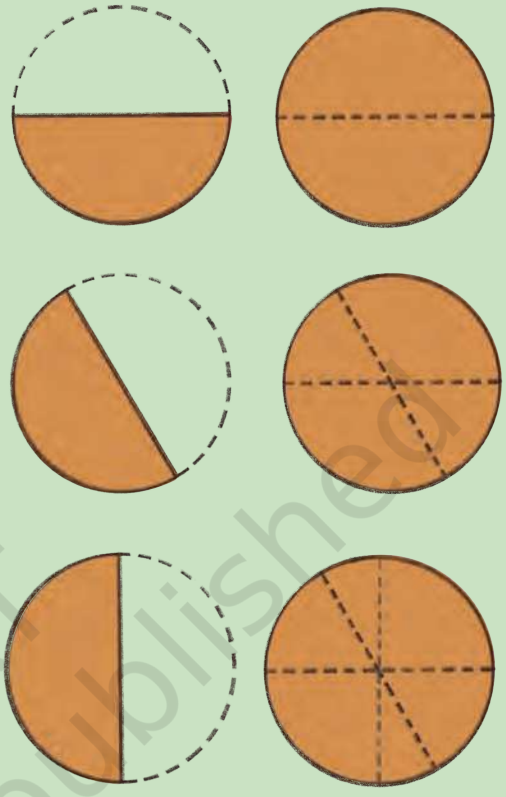
c) Open the fold and measure the length of the crease using a thread.

d) Fold your paper in half in a different way and crease it well.

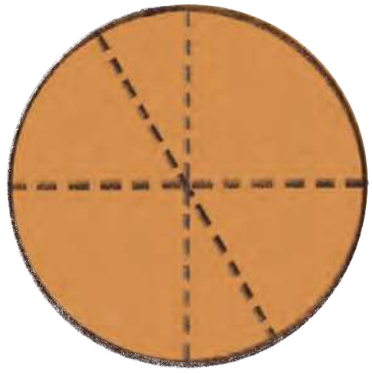
e) Open the fold and measure the length of the crease again.

f) Fold it again in half in a different way and crease it well.

g) Open the fold, measure the length of the crease.



1. The length of all the creases are _____. (Equal/Unequal)
2. These creases are called **diameters** of the circle.
3. Discuss where the centre is. Do you notice that all the diameters pass through the centre?
4. Measure the length of the creases from the center to the border of the circle. This is called the **radius** of the circle.
5. Discuss if there is any relationship between the radius and the diameter of a circle.



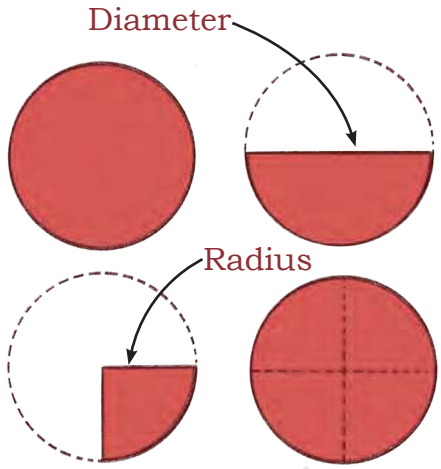
Note for Teachers: Children can measure the length using a paper strip or thread or scale.



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Let Us Do

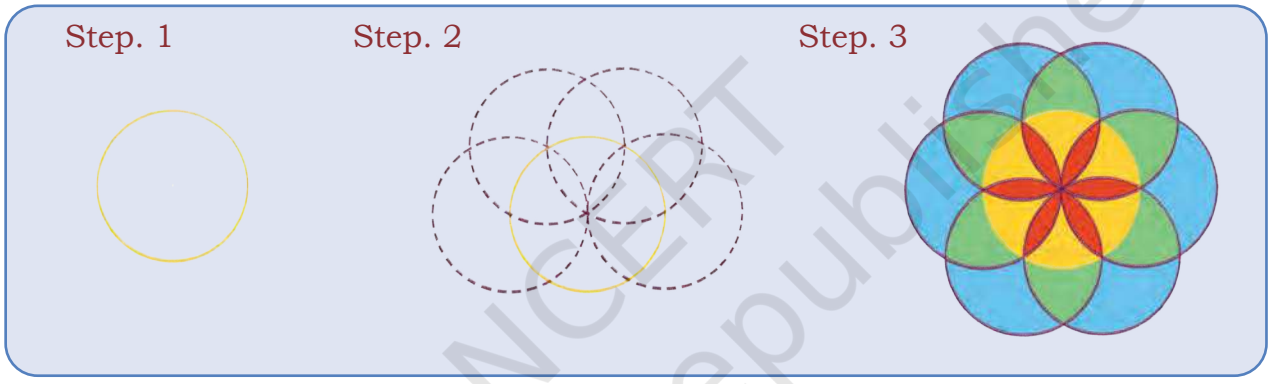


Fold the circular paper in half.

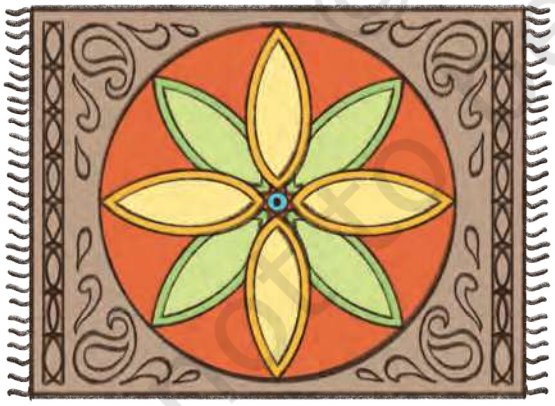
Fold this half again in half.

The length of the diameter is _____ (half/double) of the length of radius.

A circle can be made easily using a compass. Ask your teacher to help you use a compass. Make the following design.



Look at the carpet design. A beautiful circle, right?



Mark the centre, radius, and the diameter of the circular design with any colour of your choice.

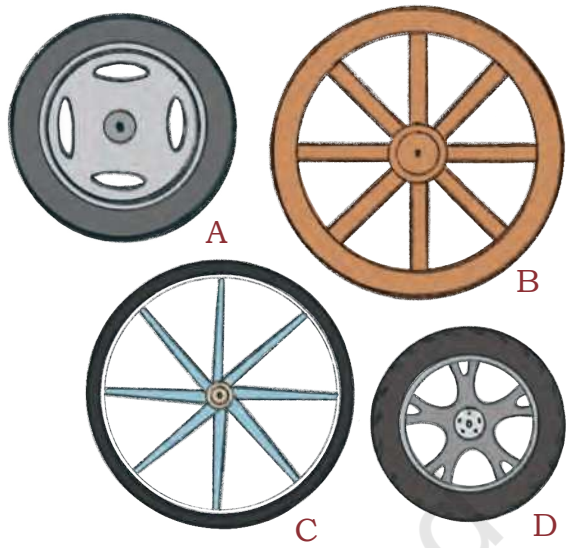
Note for Teachers: Help children to draw circles using a compass. Encourage learners to draw different-sized circles.

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Look at the wheels.

All wheels look like .....

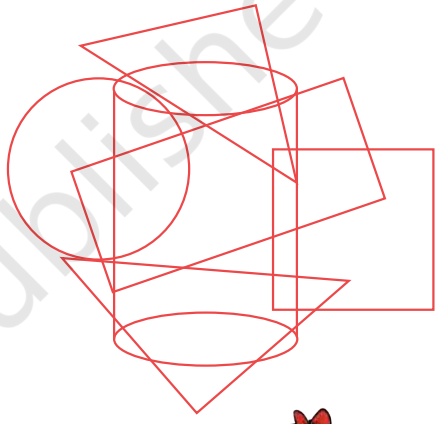


Name the wheel with the

1. longest radius .....
2. shortest radius .....
3. longest diameter .....
4. shortest diameter .....

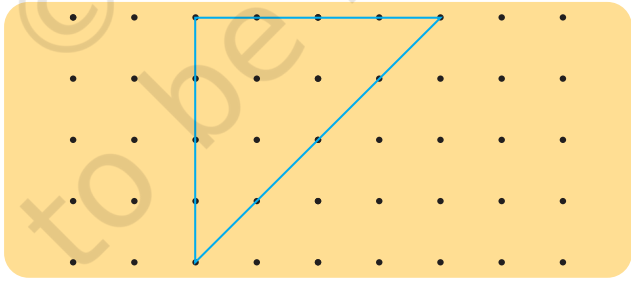
Puzzling Shapes

1. Identify the hidden shapes and write their names.

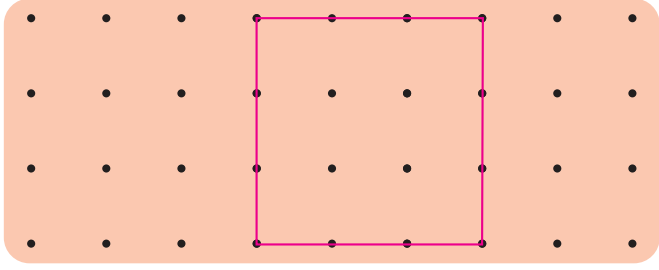


2. Draw 2 lines to divide the triangle into 1 square and 2 triangles.





3. Draw 2 lines to divide the square into 3 triangles.



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4. Draw lines to show the cuts needed on the shapes in the left column to get the smaller shapes on the right.

(A)		
(B)		
(C)		

Card Game

Sort the 2D-shape cards given at the end of the book into three groups according to their sides.

Draw the sorted shapes in the space given below. Explain why you sorted your shapes in this way.

Group 1	
Group 2	
Group 3	

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Let Us Try

1. Squiggly spiders

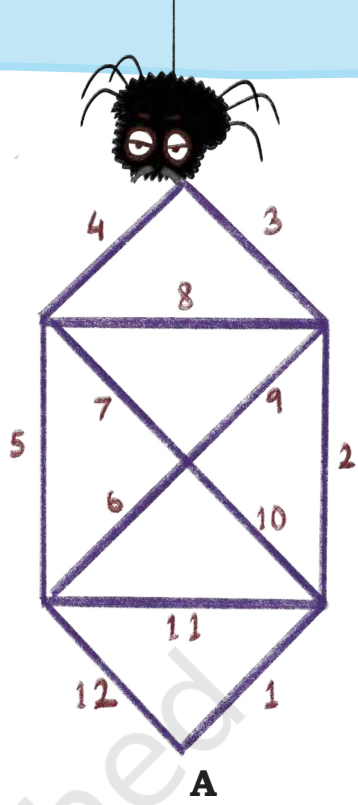
Squiggly, the spider, likes to make webs in different shapes. One day she begins to make triangular webs.

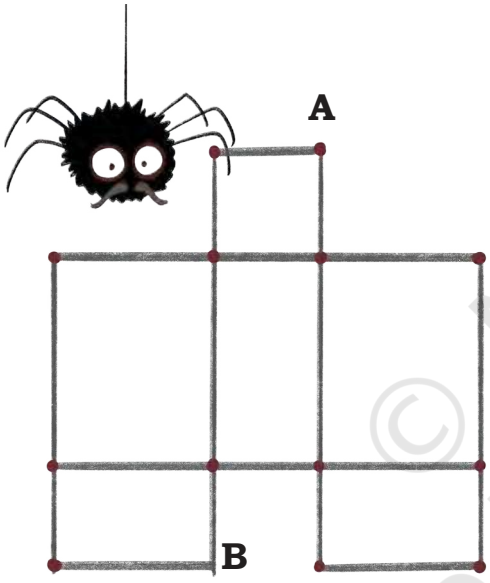
How many triangles are in her web?

She likes to take a walk each morning and check if the walls of her web are strong.

Can she begin at point A and reach back to the same point without walking on any wall more than once?

Trace and show Squiggly's path.





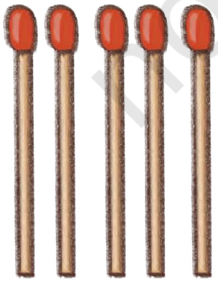
Her brother, Wiggly made a web using rectangles. How many rectangles can you see in his web?

He likes to take a walk at the end of each day and check if the walls of his web are strong.

Can he begin at point A and leave from point B without walking on any wall more than once?

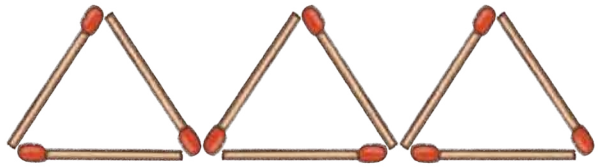
Trace and show Wiggly's path.

2. Use 5 matchsticks to make 2 triangles. Then draw it in the space provided.

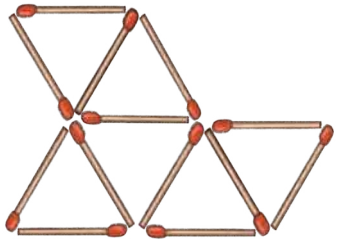


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3. Move two of these matchsticks to form 4 triangles.



4. Remove 4 of these matchsticks to leave only 3 triangles.



5. Model challenge.

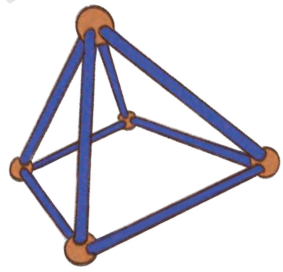
Can you make a model of solid shapes which has

a) 12 straws and 8 clay balls?

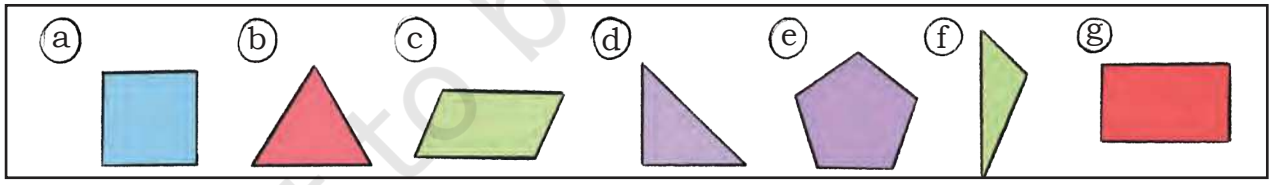
b) 9 straws and 6 clay balls?

c) 15 straws and 10 clay balls?

d) 10 straws and 6 clay balls?



6. Classify these shapes based on the number of angles.



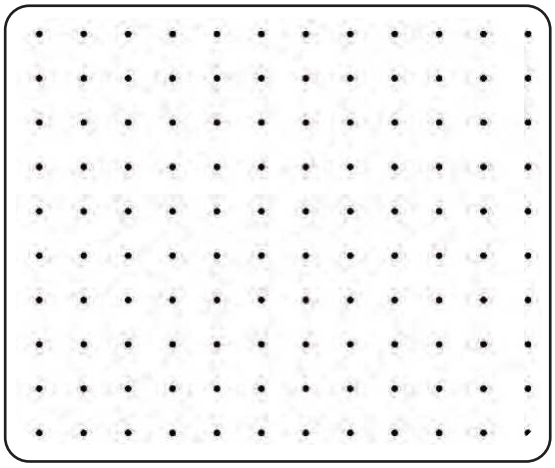
3 angles		4 angles		5 angles	

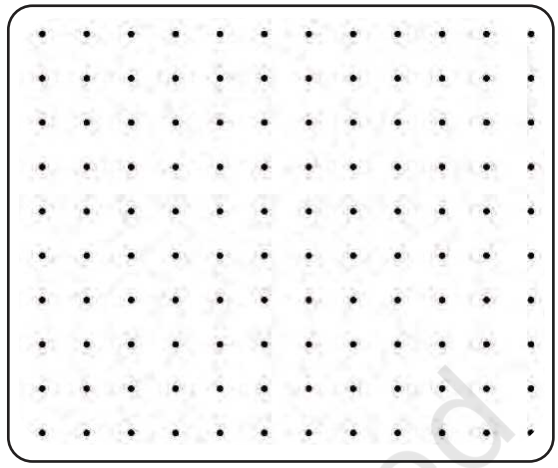
What relation do you notice between the number of sides and the number of angles?

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7. Draw a 2D shape that has less than 5 angles.

Draw a 2D shape with more than 5 angles.





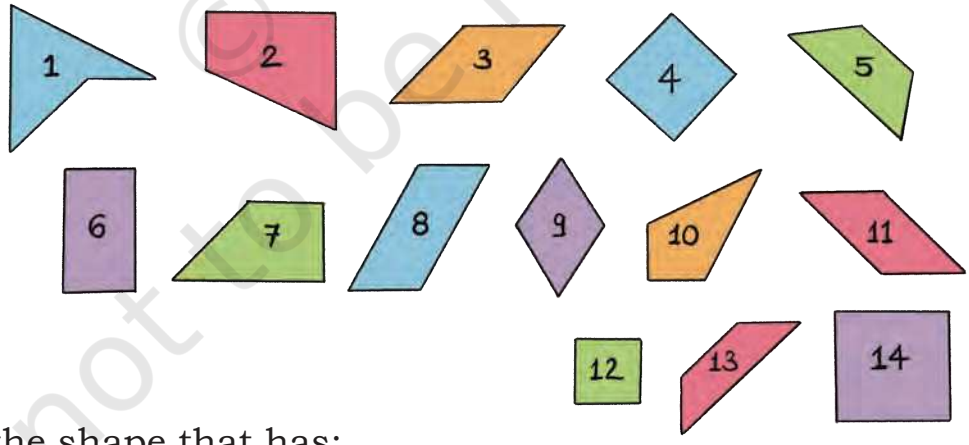
8. Mark the right angles and write the number of right angles in each figure.



_____ _____ _____ _____ _____ _____

Which of the above shapes have only right angles?

9. Observe the following shapes.



Identify the shape that has:

- 2 right angles, 1 acute, and 1 obtuse angle _____.
- 1 right, 2 obtuse, and 1 acute angle _____.
- 2 obtuse, and 2 acute angles _____.
- 4 right angles _____.

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