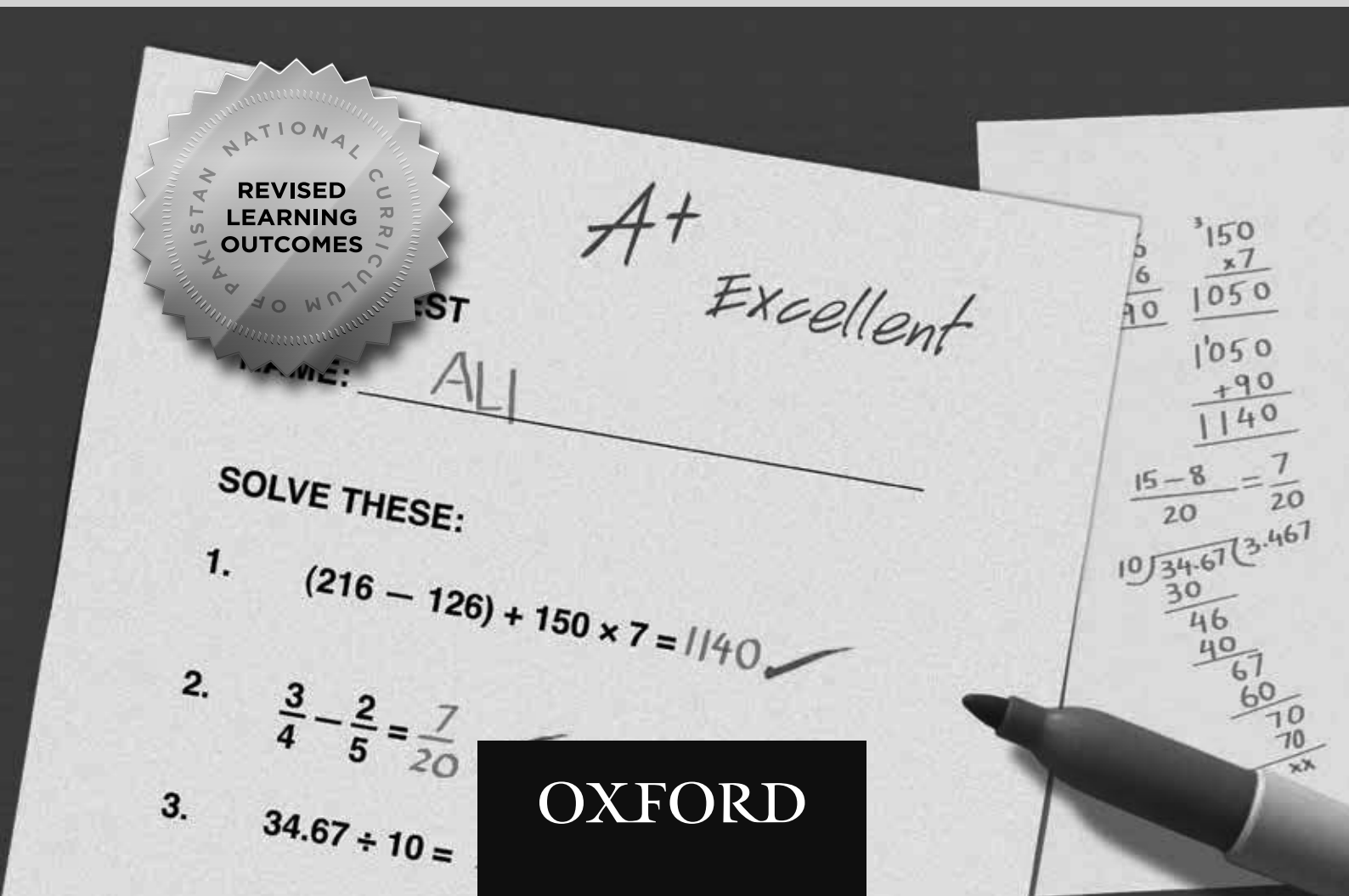
Addendum

BOOK 5

MATHS WISE



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Number Patterns

You have already studied number patterns in Book 4. You also completed the increasing and decreasing number sequences.

To find the missing numbers in a sequence or number pattern, proceed as follows.

- First, decide if the given sequence is in ascending or descending order.
- In ascending order sequence, the mathematical operations of addition and multiplication are used as pattern rules.
- In descending order sequence, the mathematical operations of subtraction and division are used as pattern rules.

Example 1

Identify the pattern rule and extend the given sequence for the next three terms.

512, 256, 128, 64

The given pattern is in descending order.

The mathematical operation we need to use is subtraction or division.

Since we can not find any common difference to move from one number to next, subtraction can not be a rule.

To move from one number to the next, we divide each number by 2.

$512 \div 2 = 256$

$256 \div 2 = 128$

$128 \div 2 = 64$

$64 \div 2 = 32$

$32 \div 2 = 16$

$16 \div 2 = 8$

Hence, the rule is dividing each number by 2.

The next three terms of the sequence are 32, 16, and 8.

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Example 2

Find the missing numbers and state the rule also.

3, 12, 48, _____, 768, _____.

This is an ascending sequence as the numbers are getting bigger.

To identify the rule, consider the first number that is 3 and the next number is 12. Now, to get 12 from 3, there are two possible ways.

$3 + 9 = 12$ and $3 \times 4 = 12$

Now, determine the next term in the sequence.

$12 + 9 = 24$ and $12 \times 4 = 48$

Hence, adding 9 is not the correct rule. The correct rule is multiplying each number of the sequence by 4 to get the next number.

$3 \times 4 = 12$

$12 \times 4 = 48$

$48 \times 4 = 192$

$192 \times 4 = 768$

$768 \times 4 = 3072$

Hence, the rule is multiplying each number by 4.

The missing numbers in the sequence are192 and 3072.

Exercise 15

Identify the pattern rule and extend for the next three terms.

1. 220, 209, 198, 187, 176, 165
2. 150, 135, 120, 105, 90, 75
3. 55, 110, 220, 440, 880
4. 896, 448, 224, 112, 56

Exercise 16

Use the following random numbers to make a pattern.

1. 49, 37, 53, 41, 45, 57

2. 32, 8, 128, 4, 64, 16

3. 15, 10, 30, 35, 25, 20

Exercise 17

Look at the following number table.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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Answer the following questions with the help of the given table.

1. Write an ascending number pattern with diagonal numbers starting from 31. State the pattern rule.

2. Find the last three numbers of the pattern given below.
93, 84, 75, ___, _____, ____.

3. Write a number pattern starting with 60 and ending in 5. State the rule also.

4. Make a number pattern of your choice, applying the rule of adding 10.

Exercise 18

Arrange the following numbers in an ascending number pattern. State the pattern rule also.

64, 128, 16, 512, 1024, 32, 256

Exercise 19

Make a descending number pattern of 5 terms using the rule of dividing by 9. The middle term is 81.

Estimation

You have been introduced to estimate the numbers in previous classes.

You can also estimate sums (the answers to addition problems), and differences (the answers to subtraction problems).

While estimating a sum or a difference we round the numbers, by changing them to the nearest tens, hundreds or thousands, then add or subtract the numbers. You have already learnt the rounding rules of numbers.

1. If the number being rounded is less than 5, round down.
2. If the number being rounded is 5 or greater, round up.

Let us consider the following examples.

Example 1

Estimate the sum of 4795 and 1831 to the nearest hundred.

First, we round the numbers to the nearest hundred.

4795 rounds up to 4800

1831 rounds down to 1800

Now we find the sum.

4800 + 1800 = 6600

Hence, the approximated sum is 6600.

Actual sum is 4795 +1831 = 6626

Actual sum is quite close to estimated sum.

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Example 2

Estimate the difference of 7932 and 3581 to the nearest hundred.

Rounding the numbers to the nearest hundred, we get,

7932 rounds down to 7900

3581 rounds up to 3600

Now, we find the difference.

7900 − 3600 = 4300

Hence the estimated difference is 4300.

Actual difference is 7932 − 3581 = 4351 which is close to the estimated difference.

Exercise 21

Estimate the following sums and differences.

1. 3580 + 5520 (to the nearest thousand)
2. 7941 − 6220 (to the nearest hundred)
3. 3270 − 1803 (to the nearest thousand)
4. 4876 + 3772 (to the nearest hundred)
5. 8008 + 1999 (to the nearest thousand)
6. 8119 − 7324 (to the nearest hundred)

Exercise 22

Solve the word problem.

1. Sana has Rs 6900 in her wallet. She wants to purchase two dresses costing Rs 3565 and Rs 2900. Estimate the total cost of two dresses. Has she enough money to purchase both the dresses? If yes, how much amount would be left after purchasing?

Comparison of Angles with right angle

You have already learnt about different types of angles in previous classes.

They are named as acute angle, obtuse angle, right angle, reflex angle, and straight angle.

These angles can be identified by comparing them as equal to, greater than, and less than a right angle. A right angle always equals to 90 degrees. So, all 90-degree angles are right angles.

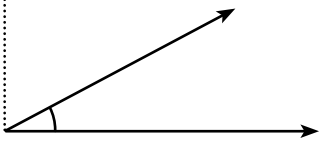
Any angle less than a 90-degree angle is called an acute angle.

Any angle bigger than a 90-degree angle is called an obtuse angle.

Any angle bigger than a180-degree angle is called a reflex angle.

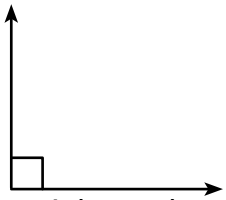
Look at the following angles.

a.



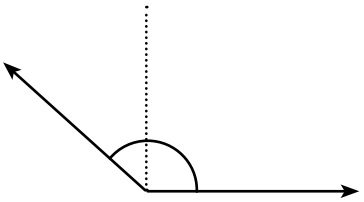
acute angle

b,



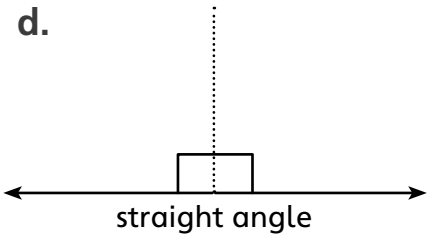
right angle

c.



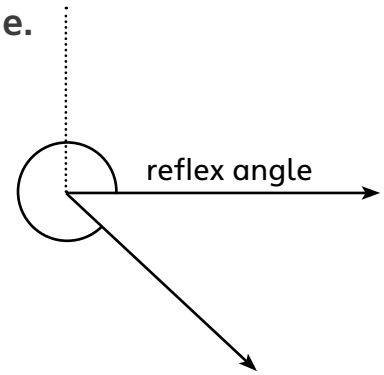
obtuse angle

d.



straight angle

e.



reflex angle

In the above figures we see that:

- turn of acute angle is smaller than the turn of right angle.
- turn of right angle is smaller than the turn of obtuse angle.
- turn of obtuse angle is smaller than the turn of straight angle.
- turn of straight angle is smaller than the turn of reflex angle.

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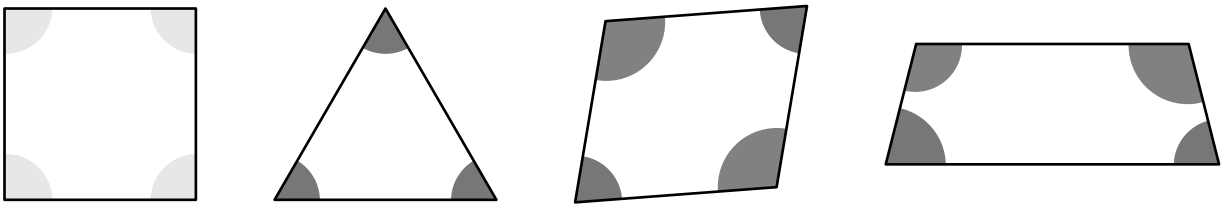
Thus, we can say that:

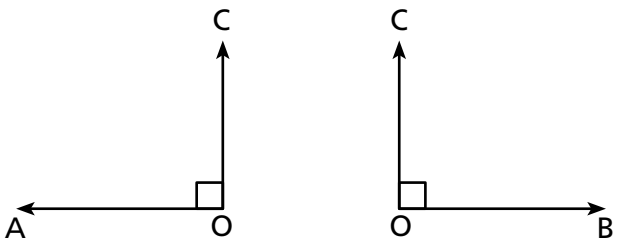
acute angle < right angle < obtuse angle < straight angle < reflex angle.

Example

In the following shapes the angles smaller than right angle have been marked with green colour, greater than right angle with blue colour, and equal to right angle with yellow colour.



Look at the figures of two right angles given below.



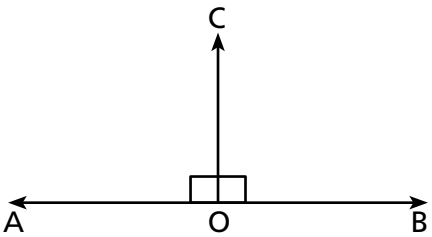
If we join the two right angles given above, we get a straight line AB with two adjacent angles of 90° each at the common vertex O.

Therefore,

$\angle AOB = \angle AOC + \angle BOC$

$= 90° + 90° = 180°$ (a straight angle)

Hence, a straight line is equivalent to two right angles.



Symmetry

You have learnt to recognise lines of symmetry in two-dimensional (2-D) shapes. You have completed a symmetrical figure with respect to a given line of symmetry on square grid/dot patterns.

There are two types of symmetry.

1. Reflective symmetry 2. Rotational symmetry

Reflective symmetry

Reflective symmetry is a type of symmetry where one half of an object is a reflection of the other half across a line without changing its size or shape.

Line of Symmetry

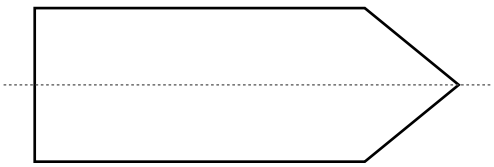
A **line of symmetry** is a line where a mirror can be kept so that one-half appears as the reflection of the other half. The reflected shape will be the same as the original shape.

If a figure can be divided into equal parts that match each other, then it is said to have **reflective symmetry**.

Reflective symmetry is easy to see, because one half is the reflection of the other half. A figure can have one or more lines of symmetry. The line of symmetry can be in any direction.

Example 1

This shape has one line of symmetry.

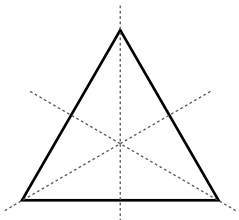


Example 2

This shape has 2 lines of symmetry.

Example 3

The equilateral triangle has 3 lines of symmetry.



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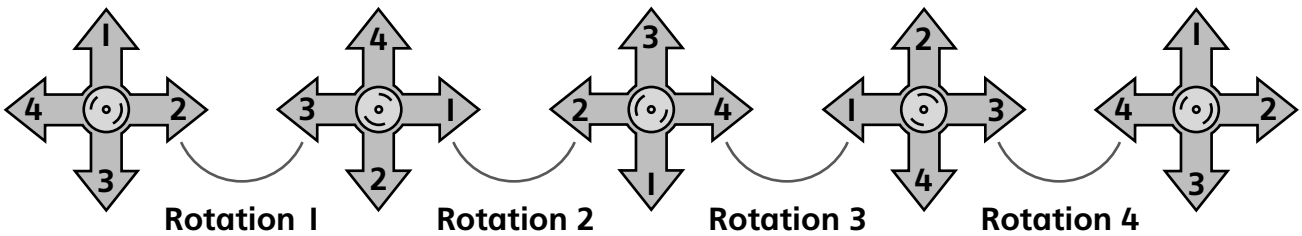
Rotational symmetry

Rotation is the movement of an object along a circular path about a fixed point without changing its size or shape.

A figure has **rotational symmetry** if it coincides with itself in a rotation of less than 360 degrees about a fixed point. The fixed point is called the **point of rotation**.

The **order of rotation** of a figure is the number of times it coincides with itself in a rotation of less than 360 degrees.

Example 4



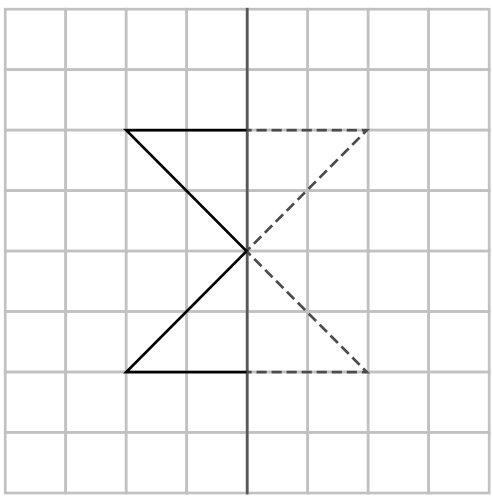
For every rotation the given shape coincides with its original shape.

Therefore, order of rotation is 4.

Example 5

Symmetry on a square grid.

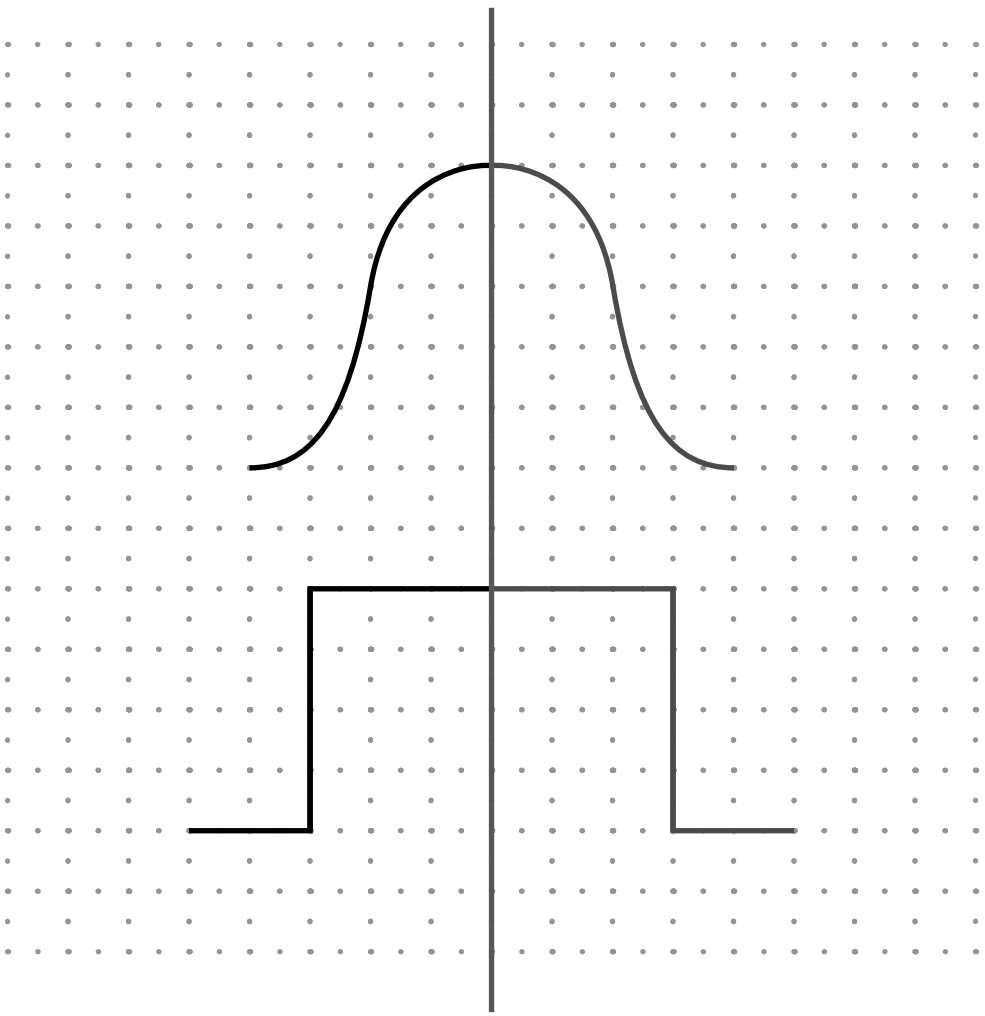
Draw symmetrical figure on the other side of line of symmetry.



Example 6

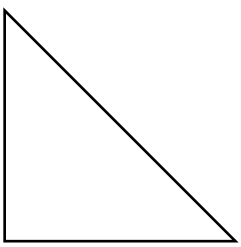
Symmetry on a dotted grid.

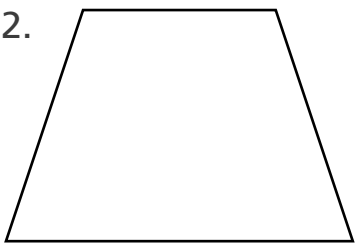
Draw symmetrical figures on the other side of line of symmetry.

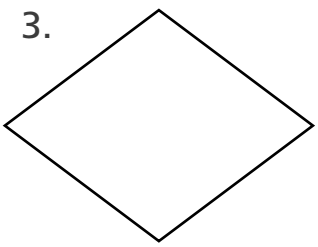


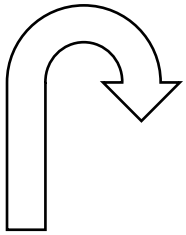
Exercise 21

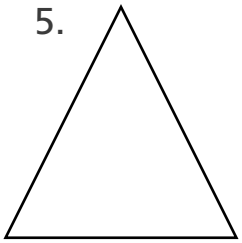
How many lines of symmetry does each shape have?

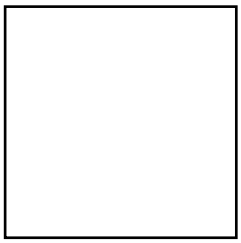
1. 

2. 

3. 

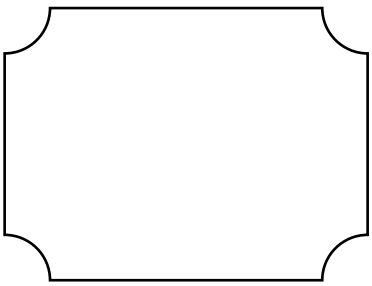
4. 

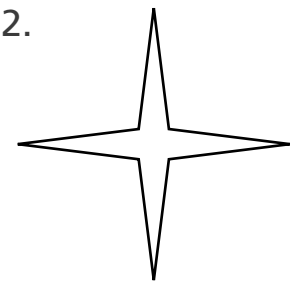
5. 

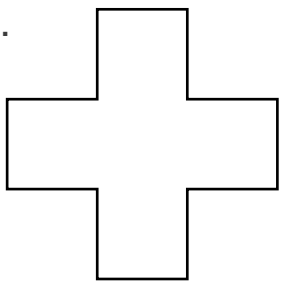
6. 

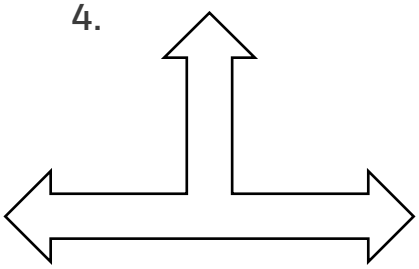
Exercise 22

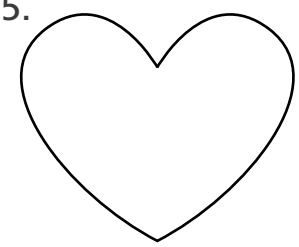
Find point of rotation and order of rotational symmetry in the following shapes.

1. 

2. 

3. 

4. 

5. 

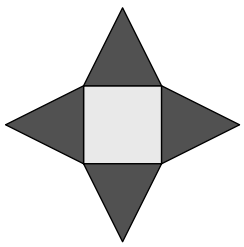
Three-dimensional Figures

Net of three-dimensional solids

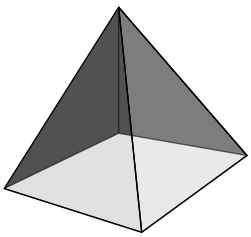
In previous classes you have learnt a lot about three-dimensional objects. Some of the solid shapes are cube, cuboid, cone, cylinder, pyramid, and sphere etc. In this unit you will learn that these solid shapes can be transformed into plane shapes. In other words, all the solid shapes can be split in plane shapes by opening them flat.

Net of a square based pyramid

For example, let us take a square based pyramid and dissect it. Dissecting three-dimensional shape means opening it along its edges. A square based pyramid has five faces and can also be laid out flat making a net of itself. This is what it would look like when opened out flat. The open shape is called the net of the square based pyramid and it is a two-dimensional shape.



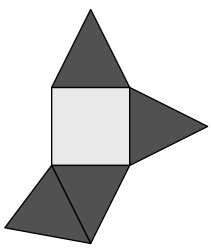
net of the square based pyramid

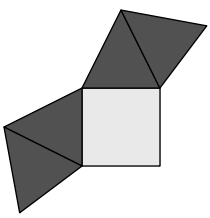


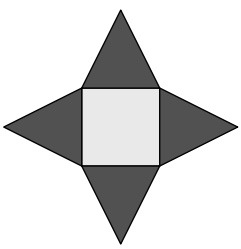
a square based pyramid

A pyramid can have different nets with different arrangement of its faces.

Following are the different nets of a square based pyramid.



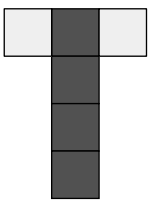


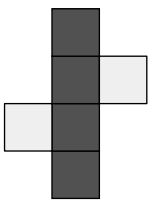


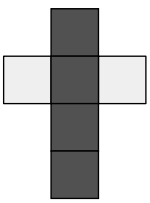
Example 1

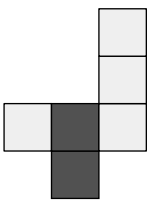
Nets of a cube

A cube has six faces and can be opened differently getting different nets. Can you guess which of the following is not a net of a cube?





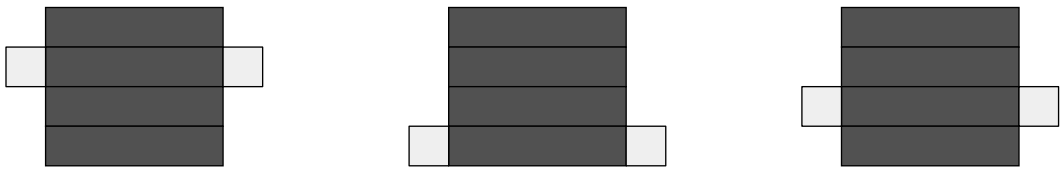




Example 2

Nets of a cuboid

Now let us consider a cuboid. A cuboid has six faces and can also be laid out flat making a net of itself. A cuboid also has different nets with different arrangement of its faces.



Three-dimensional objects

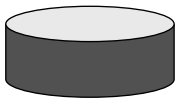
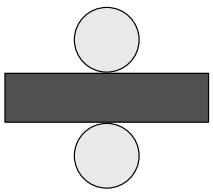
A three-dimensional figure is defined as a solid shape or an object that has three dimensions – length, width, and height. Three-dimensional objects have one more dimension as compared to two-dimensional shapes, that is thickness or depth or height.

We see three-dimensional objects all around us. Three-dimensional objects are described according to their faces, vertices and edges. Some of the three-dimensional objects have been described for your information.

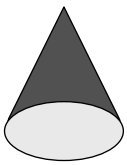
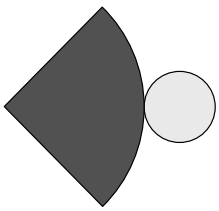
3D object	Number of faces	Number of vertices	Number of edges
cube	6	8	12
cuboid	6	8	12
cylinder	3	0	2
cone	2	1	1
sphere	0	0	0
pyramid	5	5	8

Three-dimensional objects can be made with the help of their nets. You have studied the nets of a cube, a cuboid, and a pyramid. Now you will study some more three-dimensional shapes with their nets. You can make those solid shapes with the help of their nets.

Example 1

Object	Shape	Net
Cylinder		

Example 2

Object	Shape	Net
Cone		

Exercise 24

Complete the table.

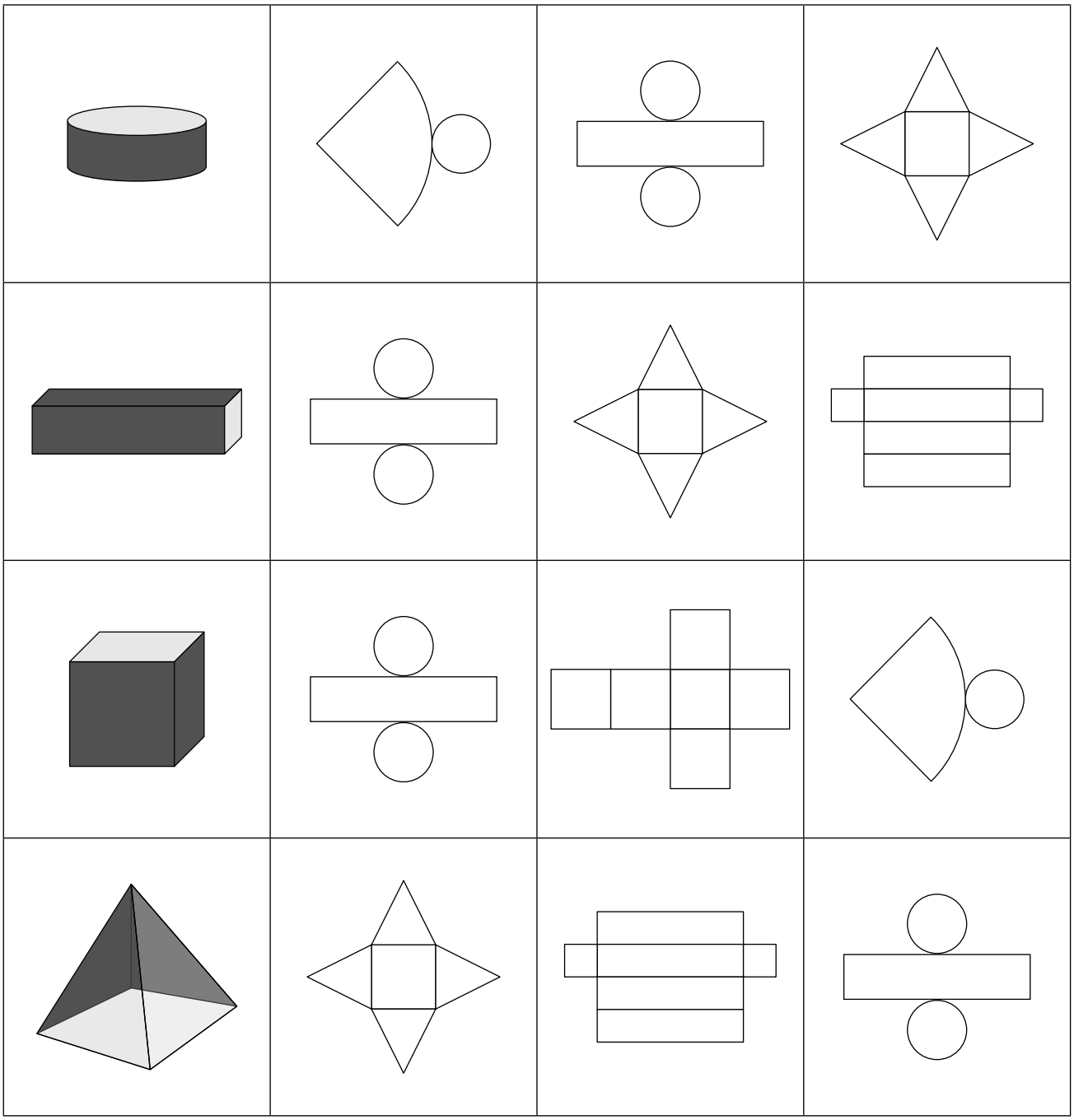
	Cube	Cuboid	Pyramid
Number of faces			
Net of the shape			

Exercise 25

Draw two nets for a cuboid.

Exercise 26

Colour the correct net for each 3D shape.



Maths Wise meets the objectives of the Pakistan National Mathematics Curriculum. The contents of the course meet the requirements of any other curriculum.

Mathematics has always been central to a child's education and is a vital tool in dealing with real-life problems. The main objective of this course is to present lessons in a simple but interesting manner so that students make their own discoveries with some help from the teacher. Each lesson is preceded by a practical activity that helps learning through discovery.

Key features:

- An interactive teaching method is used and lessons include real-life, multi-sensory learning situations.
- The colourfully illustrated books are attractive to learners.
- Plenty of exercises and suggestions for extra activities are included which provide sufficient problem-solving practice for each concept.
- Great emphasis is placed on allowing each student to learn at his/her own pace.
- Teaching Guides, which include extra worksheets, indicate how lessons can be taught in order to derive maximum learning. Suggestions for making attractive charts and a maths lab are also included in the Guides.

Components:

- Introductory Books 1, 2, and 3
- Books 1–8
- Teaching Guides for all levels (available in print as well as on OUP website.)
- Wall charts for Introductory Books 1, 2, and 3

Supplementary reading:

OUP's *Oxford First Maths Dictionary* is recommended as reference material for primary level.

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