

* Choose The Right Answer From The Given Options.

[38]

1. An equilateral triangle has:

- (A) 3 lines of symmetry
- (B) 2 lines of symmetry
- (C) 1 line of symmetry
- (D) no lines of symmetry

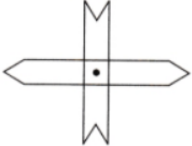
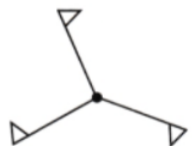
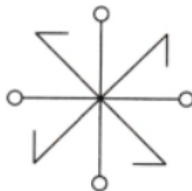

Ans. : A. 3 lines of symmetry

2. A rectangle has an angle of symmetry:

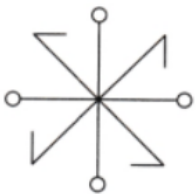
- (A) 60°
- (B) 90°
- (C) 180°
- (D) 270°

Ans. : C. 180°

3. Which of the following figures has the order of rotational symmetry 4?

- (A) 
- (B) 
- (C) 
- (D) 

Ans. : C.



4. Number of lines of symmetry in a rhombus is:

- (A) 0
- (B) 1
- (C) 2
- (D) 4

Ans. : C. 2

5. In a regular polygon of n sides, the number of lines of symmetry is:

- (A) 0
- (B) 1
- (C) n
- (D) an infinite number

Ans. : C. n

6. Which one of the following polygons has only one line of symmetry?

- (A) Isosceles triangle
- (B) Square
- (C) Rectangle
- (D) Equilateral triangle

Ans. : A. Isosceles triangle

7. Which one of the following figures has infinitely many lines of symmetry?

- (A) Pentagon
- (B) Hexagon
- (C) Circle
- (D) Line Segment



Ans. : C. Circle

8. Which one of the following triangles has both rotational and line symmetry?

- (A) Isosceles triangle (B) Equilateral triangle
(C) Scalene triangle (D) Right-angled triangle

Ans. : B. Equilateral triangle

9. Identify the letter of English alphabets which has vertical line of symmetry?

- (A) M (B) B (C) E (D) K

Ans. : A. M

10. Identify the letter of English alphabets which has horizontal line of symmetry?

- (A) A (B) V (C) W (D) X

Ans. : D. X

11. Which of the following letters of English alphabets has no rotational symmetry?

- (A) O (B) N (C) Z (D) K

Ans. : D. K

12. Which of the following quadrilaterals has only rotational symmetry?

- (A) Rectangle (B) Square (C) Rhombus (D) Parallelogram

Ans. : D. Parallelogram

13. How many line of symmetry does the letter Q has?

- (A) zero (B) infinite (C) 1 (D) 2

Ans. : Option (a) is correct.

Explanation:

No line of symmetry (not symmetrical)



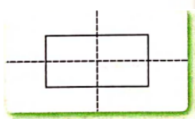
14. How many lines of symmetry does a rectangle have ?

- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : Option (b) is correct.

Explanation:

Lines of symmetry in rectangle



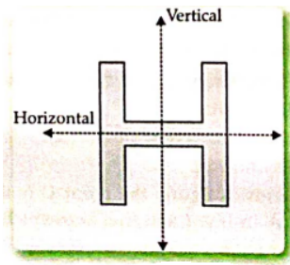
15. The number of lines of symmetry of letter H is:

- (A) 0 (B) 1 (C) 2 (D) 4

Ans. : Option (c) is correct.

Explanation:

The number of lines of symmetry for letter H is 2. One horizontal and one vertical.



16. How many lines of symmetry' are in circle?

- (A) Zero (B) Two (C) Six (D) Infinite (Easy)

Ans. : Option (d) is correct.

Explanation:

There can be many lines of symmetry' passing through its centre called diameter.

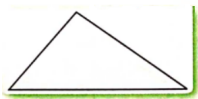
17. How many lines of symmetry does the following.

- (A) 3 (B) 2 (C) 1 (D) 0

Ans. : Option (d) is correct.

Explanation:

Scalene triangle has no line of symmetry.



18. The angle of rotation of an equilateral triangle is:

- (A) 120° (B) 270° (C) 180° (D) 360°

Ans. : Option (a) is correct.

Explanation:

The angle of rotation of an equilateral triangle is 120° .

19. The number of lines of symmetry that a quadrilateral cannot have is

- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : Option (c) is correct.

Explanation:

Number of lines of symmetry in quadrilateral cannot be three.

20. The letter which has both line and rotational symmetry is:

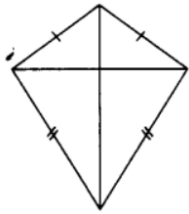
- (A) H (B) M (C) S (D) Y

Ans. : Option (a) is correct.

Explanation:

The letter which has both lines and rotational symmetry is H.

21. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans.: (A) 1

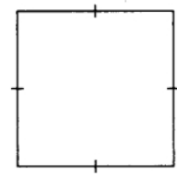
22. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : (B) 2

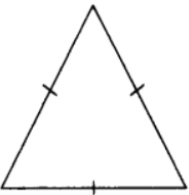
23. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : (D) 4

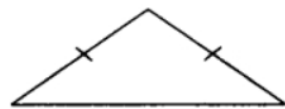
24. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : (C) 3

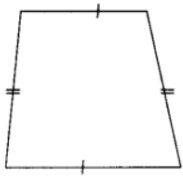
25. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans.: (A) 1

26. How many lines of symmetry does the figure have?



- (A) 1 (B) 2
(C) 3 (D) no line of symmetry

Ans. : (D) no line of symmetry

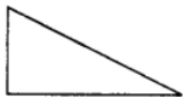
27. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) Countless.

Ans. : (D) Countless.

28. How many lines of symmetry does the figure have?



- (A) 0 (B) 1 (C) 2 (D) countless

Ans.: (A) 0

29. How many lines of symmetry does the figure have?



- (A) 1 (B) 2 (C) 3 (D) 4

Ans. : (B) 2

30. How many lines of symmetry does a regular hexagon have?

- (A) 1 (B) 3 (C) 4 (D) 6

Ans. : (D) 6

31. Which of the following letters has horizontal line of symmetry?

- (A) C (B) A (C) J (D) L

Ans.: (A) C

32. Which of the following letters has horizontal line of symmetry?

(A) Z (B) V (C) U (D) E

Ans. : (D) E

33. Which of the following letters has horizontal line of symmetry?

(A) S (B) W (C) D (D) Y

Ans. : (C) D

34. Which of the following letters has vertical line of symmetry?

(A) R (B) C (C) B (D) T

Ans. : (D) T

35. Which of the following letters has vertical line of symmetry?

(A) N (B) K (C) B (D) M

Ans. : (D) M

36. Which of the following letters has vertical line of symmetry?

(A) J (B) D (C) E (D) O

Ans. : (D) O

37. Which of the following letters has no line of symmetry?

(A) P (B) O (C) H (D) X

Ans.: (A) P

38. Which of the following letters has no line of symmetry?

(A) O (B) X (C) I (D) Q

Ans. : (D) Q

* a statement of Assertion (A) is followed by a statement of Reason (R). Choose [3]
the correct option.

39. Assertion (A): There are infinite lines of symmetry in a circle.

Reason (R): The diameter is the mirror line of symmetry of a circle and there are infinite diameters possible for a given circle. [Medium]

(A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are the true, but Reason (R) is not a correct explanation of Assertion (A).

(C) Assertion (A) is true and Reason (R) is false.

(D) Assertion (A) is false and Reason (R) is true.

Ans. : Option (a) is correct.

Explanation:

There are infinite lines of symmetry of a circle because the lines of symmetry of a



circle can be drawn from any angles and the diameter in a circle is the mirror line of symmetry of a circle and there are infinite diameters possible for a given circle.

40. Assertion (A): A square has six lines of symmetry.

Reason (R) : A line of symmetry is a line that divides the object in two identical parts.

(A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are the true, but Reason (R) is not a correct explanation of Assertion (A).

(C) Assertion (A) is true and Reason (R) is false.

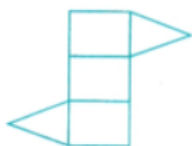
(D) Assertion (A) is false and Reason (R) is true.

Ans. : Option (d) is correct.

Explanation:

A square has 4 lines of symmetry, not 6 lines of symmetry. And symmetry is a line which divides it into two equal parts.

41. Assertion: The given figure has rotational symmetry of order 2.



Reason: A figure that has an angle of symmetry 180 degrees is said to have rotational symmetry of order 2.

In the given question, a statement of Assertion is followed by a statement of Reason. Choose the correct option as:

(A) Assertion and Reason both are correct and Reason is the correct explanation of the Assertion.

(B) Assertion and Reason both are correct but Reason is not the correct explanation of the Assertion.

(C) Assertion is correct but Reason is not correct.

(D) Assertion is not correct but Reason is correct.

Ans. : A. Assertion and Reason both are correct and Reason is the correct explanation of the Assertion.

* **State Whether The Following Sentences Are True Or False.** [1]

42. A semi-circle has two lines of symmetry.

Ans. : False

* **Fill In The Blanks With Correct Alternative.** [16]

43. A line of _____ divides a figure into two equal parts.



Ans. : symmetry

44. An isosceles triangle has _____ line of symmetry.

Ans. : one

45. An equilateral triangle has _____ lines of symmetry.

Ans. : three

46. A scalene triangle has _____ line of symmetry.

Ans. : no

47. A rectangle has _____ order of rotational symmetry.

Ans. : two

48. A square has _____ lines of symmetry.

Ans. : four

49. A regular hexagon has _____ degrees the angle of symmetry.

Ans. : 60°

50. A circle has _____ lines of symmetry.

Ans. : an infinite number of

51. A rhombus has rotational symmetry of order _____

Ans. : 2

52. A kite is symmetrical about its longer _____

Ans. : diagonal

53. The line of symmetry of an object is also called its _____ of symmetry.

Ans. : axis

54. A plane figure through which no axis of symmetry can be drawn is said to be _____

Ans. : asymmetric

55. Line of symmetry is also called as the _____ [axis of symmetry/origin of symmetry].

Ans. : axis of symmetry

56. The object and its image are _____ [symmetrical/not-symmetrical] with reference to the mirror-line.

Ans. : symmetrical

57. In a Kaleidoscope there are _____ [two/four] mirrors.

Ans. : two

58. Rotating a figure through 90° clockwise is the same as rotating it through _____ ($270^\circ/180^\circ$) anti-clockwise.



Ans. : 270°

* Answer The Following Questions In One Sentence.[1 Marks Each]

[11]

59. How many lines of symmetry are there in the letter H?

Ans. : Two

60. How many letters of the English alphabet have both rotational and line symmetry? Write them.

Ans. : 4; H, I, O, X

61. How many lines of symmetry can there be in an irregular shape?

Ans. : Zero

62. What is the order of rotational symmetry in a rectangle?

Ans. : Two

63. Find the order of rotational symmetry for each of the following polygons:

- (i) Rhombus
- (ii) Regular pentagon
- (iii) Regular hexagon
- (iv) Regular octagon

Ans. : (i) 2

(ii) 5

(iii) 6

(iv) 8

64. What name is given to a geometrical property which refers to the exact match in shape and size between two halves of an object?

Ans. : Symmetry

65. What does the meaning of lateral difference in mirror reflection?

Ans. : Lateral difference means the left part of the object seems to be right part of image and vice versa.

66. Complete the figure so that dotted lines are its line of symmetry.



Ans. :



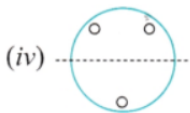
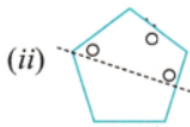
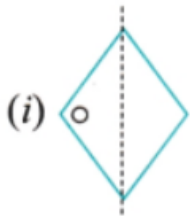
67. The figure has been created by punching a single hole after folding the paper twice. How has the paper been folded?



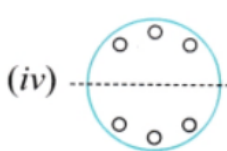
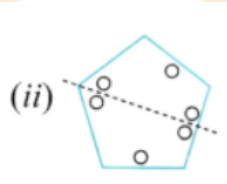
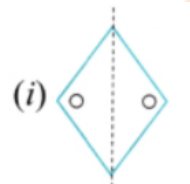
Ans. : It has been folded diagonally.



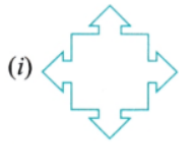
68. Given the line(s) of symmetry, find the other hole(s):



Ans. :



69. Find the number of lines of symmetry and angles of rotational symmetry of the following figures.



Ans. :

Figure	Number of Lines Symmetry	Angles of Rotational Symmetry
(i)	4	$90^\circ, 180^\circ, 270^\circ$ and 360°
(ii)	3	$120^\circ, 240^\circ$ and 360°

* Questions With Calculation.[2 Marks Each]

[24]

70. Suppose you have to get each of these shapes with some folds and a single straight cut. How will you do it?

(a) The hole in the center is a square.



(b) The hole in the center is a square.



Ans. : (a) By folding the square sheet along length or breadth and cutting a square at the center, we can get a square.

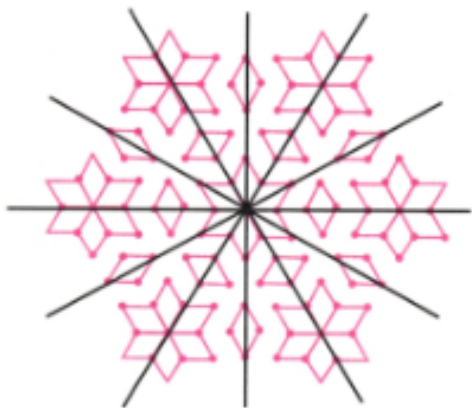
(b) To get the figure as shown, we fold the square diagonally and then cut the required shape in it.



71. Find the lines of symmetry for the kolam below.



Ans. :

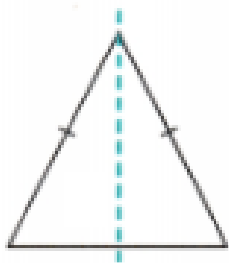


The kolam has 6 lines of symmetry

72. Draw the following.

A triangle with exactly one line of symmetry

Ans. :

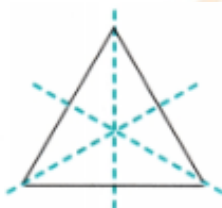


An isosceles triangle has one line of symmetry

73. Draw the following.

A triangle with exactly three lines of symmetry

Ans. :

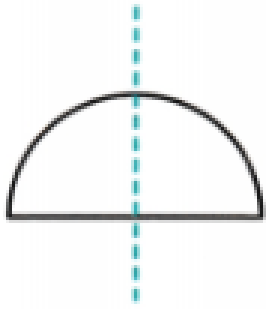


An equilateral triangle has one line of symmetry.



74. Draw the following.
A figure with exactly one line of symmetry

Ans. :



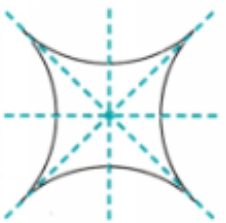
75. Draw the following.
A figure with exactly two lines of symmetry

Ans. :



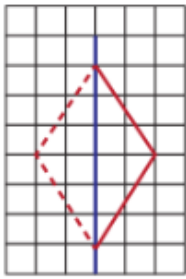
76. Draw the following.
A figure with exactly four lines of symmetry

Ans. :

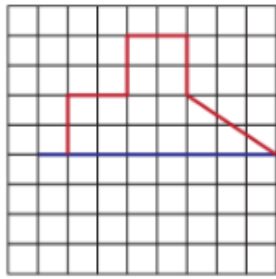


77. Copy the following on squared paper. Complete them so that the blue line is a line of symmetry. Problem (a) has been done for you.

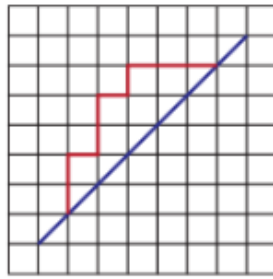
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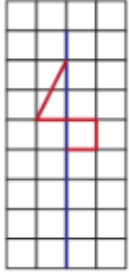
(a)



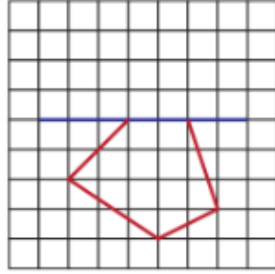
(b)



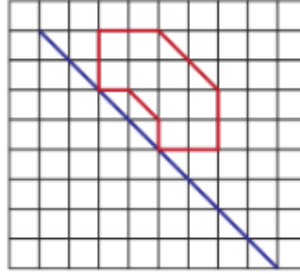
(c)



(d)

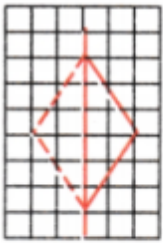


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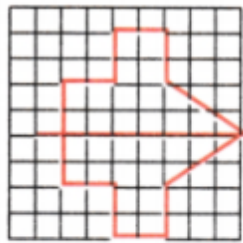


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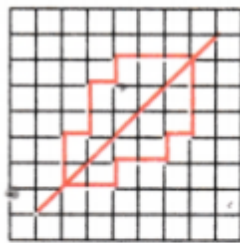
Ans. :



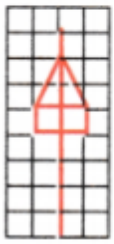
(a)



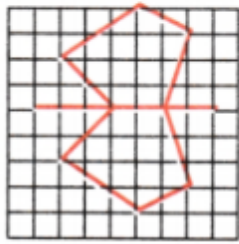
(b)



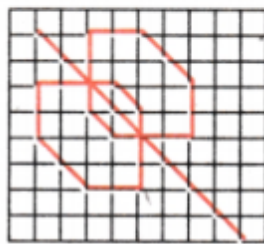
(c)



(d)



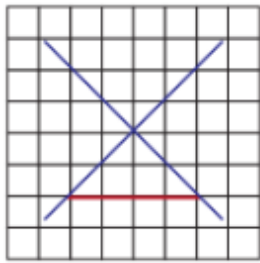
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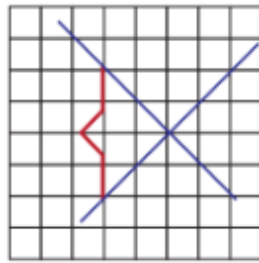
(f)

78. Copy the following drawing on squared paper. Complete each one of them so that the resulting figure has the two blue lines as lines of symmetry.

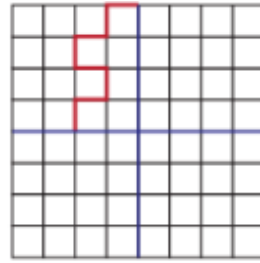
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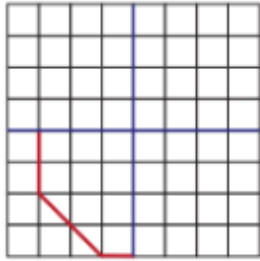
(a)



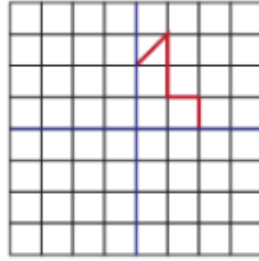
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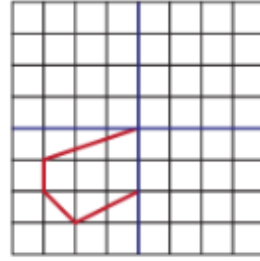
(c)



(d)

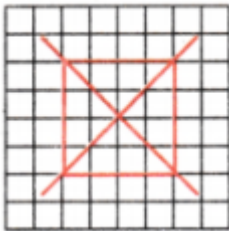


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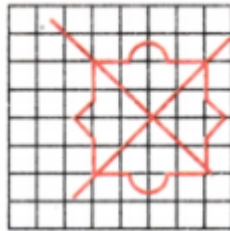


(f)

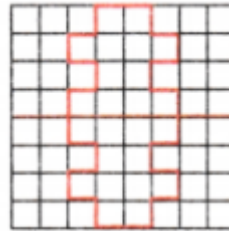
Ans. :



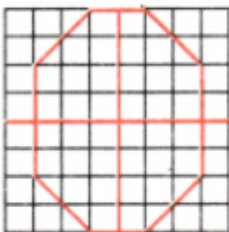
(a)



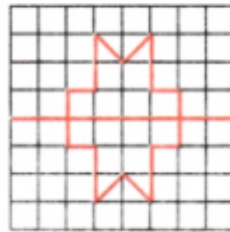
(b)



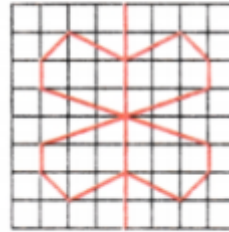
(c)



(d)

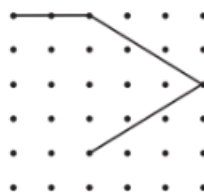
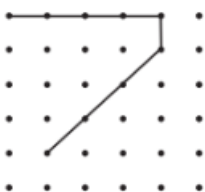
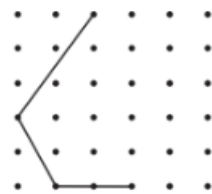
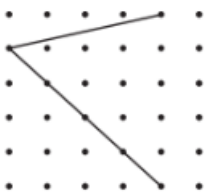


(e)

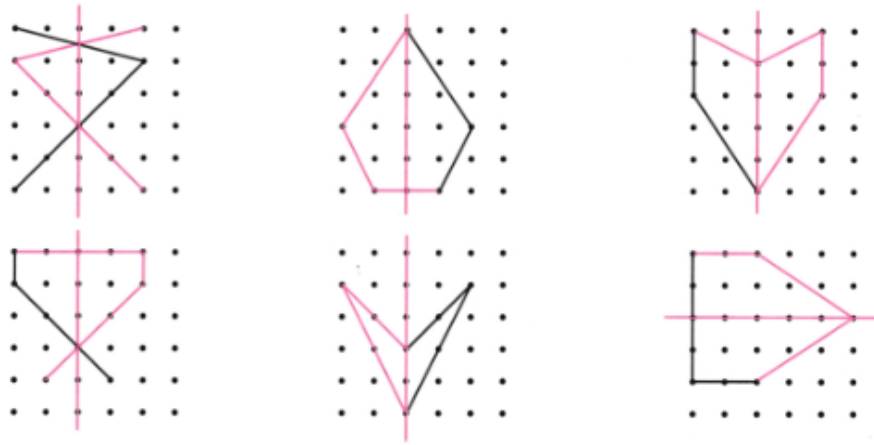


(f)

79. Copy the following on a dot grid. For each figure draw two more lines to make a shape that has a line of symmetry.

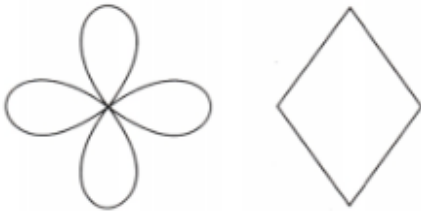


Ans. :



80. Draw two figures other than a circle and a square that have both reflection symmetry and rotational symmetry.

Ans. :



81. In a figure, 60° is the smallest angle of symmetry. What are the other angles of symmetry of this figure?

Ans. : It will also look the same by rotating at an angle of 120° , 180° , 240° , 300° , and 360° as these are the multiples of 60° .

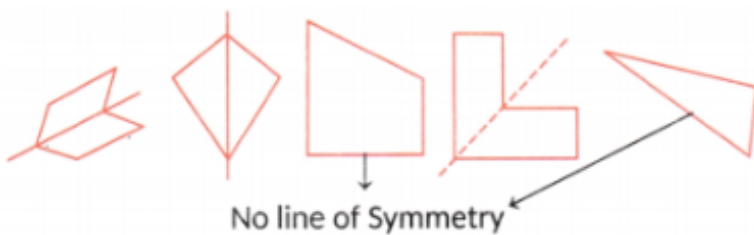
* Questions With Calculation.[3 Marks Each]

[27]

82. For each of the following figures, Identify the line(s) of symmetry if it exists.

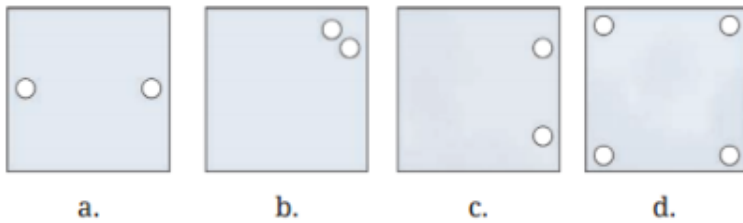


Ans. :

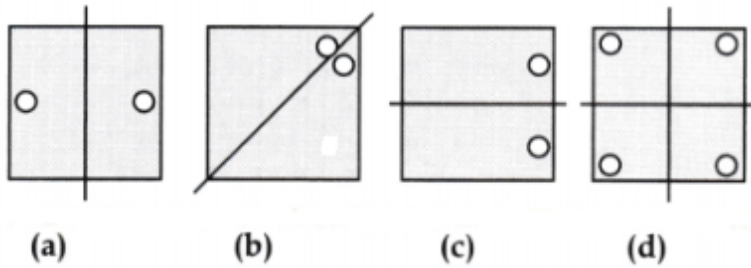


83. In each of the following figures, a hole was punched in a folded square sheet of paper and then the paper was unfolded. Identify the line along which the paper was folded.

Figure (d) was created by punching a single hole. How was the paper folded?



Ans. :

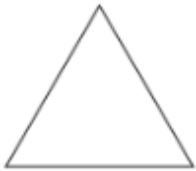


84. How many lines of symmetry do these shapes have?

(i)



(ii) A triangle with equal sides and equal angles.



(iii) A hexagon with equal sides and equal angles.



Ans. : (i) A diamond has 4 lines of symmetry, and the figure next to it has 4 lines of symmetry.

(ii) An equilateral triangle has three lines of symmetry.

(iii) A regular hexagon has six lines of symmetry.

85. Draw the following.

A triangle with no line of symmetry

Is it possible to draw a triangle with exactly two lines of symmetry?

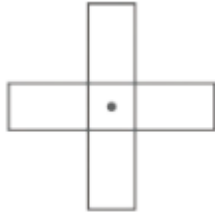
Ans. :



A scalene triangle has no lines of symmetry.

No, it is not possible to draw a triangle with exactly two lines of symmetry.

86. Find the angle of symmetry for the given figures about the point marked.



(a)



(b)



(c)

Ans. : (a) 90°

(b) 360°

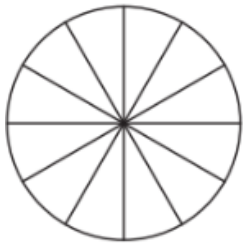
(c) 180°

87. Color the sectors of the circle below so that the figure has

(a) 3 angles of symmetry

(b) 4 angles of symmetry

(c) what are the possible numbers of angles of symmetry you can obtain by coloring the sectors in different ways?



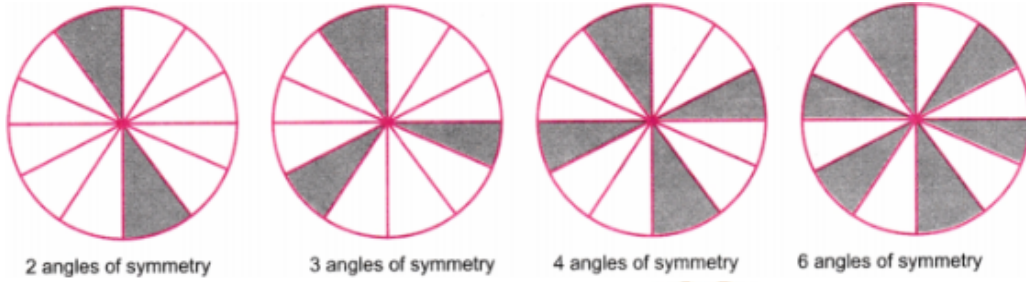
Ans. : (a) Will look same after every rotation of 120° .



(b) Will look same after every rotation of 90° .



(c) Four ways are possible.



88. Can we have a figure with rotational symmetry whose smallest angle of symmetry is
- (a) 45° ?
- (b) 17° ?

Ans. : (a) Since, the complete rotation is 360° . Then, if the given angle divides 360° , it can be an angle of symmetry.

Here, $\frac{360^\circ}{45^\circ} = 8$, which is a whole number.

Therefore, 45° can be the smallest angle of symmetry of a figure.

(b) Here, $\frac{360^\circ}{17^\circ} = 21\frac{3}{17}$, which is not a whole number. Therefore, 17° cannot be the smallest angle of symmetry.

89. How many lines of symmetry do the shapes in the first shape sequence in Chapter 1, Table 3, the Koch Snowflake sequence, have? What angle of symmetry?

Ans. :

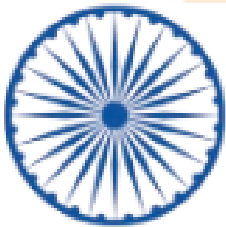


The triangular shape has 3 lines of symmetry and 3 angles of symmetry.

In six-pointed stars, lines of symmetry are 12 and the angle of symmetry is 6.

The lines of symmetry and angle of symmetry for the rest three figures are the same as six-pointed stars.

90. How many lines of symmetry and angles of symmetry does Ashoka Chakra have?



Ans. : The Ashoka Chakra has 24 spokes spread equally.

24 spokes make 12 pairs.

Line through an opposite pair is a line of symmetry.

Hence, there are 12 lines of symmetry.

Smallest angle of symmetry = $360^\circ \div 2 = 30^\circ$.



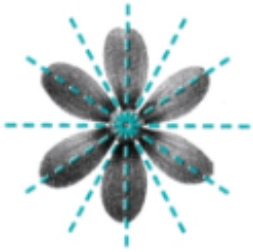
Other angles of symmetry are its multiple up to 360.
Other angles are 60° , 120° , 150° , , 360° . (12 angles in all).

*** Questions With Calculation.[5 Marks Each]**

[35]

91. Do you see any line of symmetry in the figures at the start of the chapter? What about in the picture of the cloud?

Ans. : (a) Yes, there are six lines of symmetry.



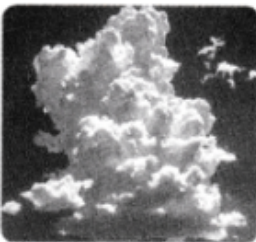
(b) Yes, there is one line of symmetry.



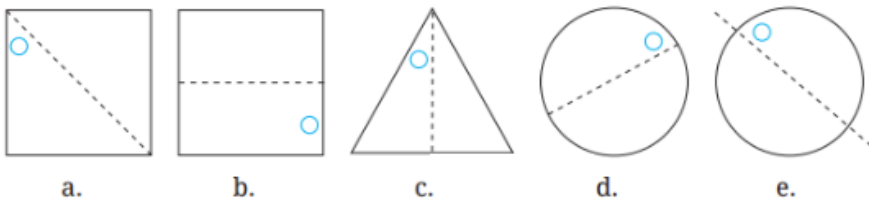
(c) Yes, there are four lines of symmetry.



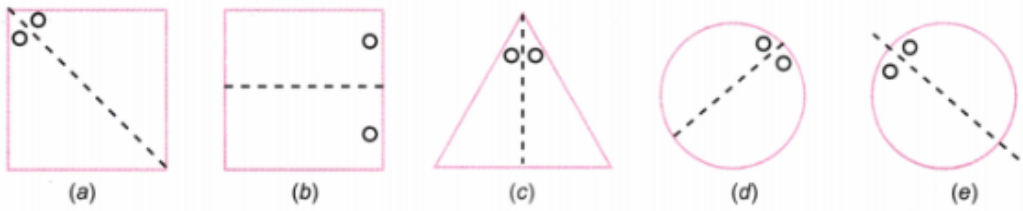
(d) There are no lines of symmetry in the picture of clouds.



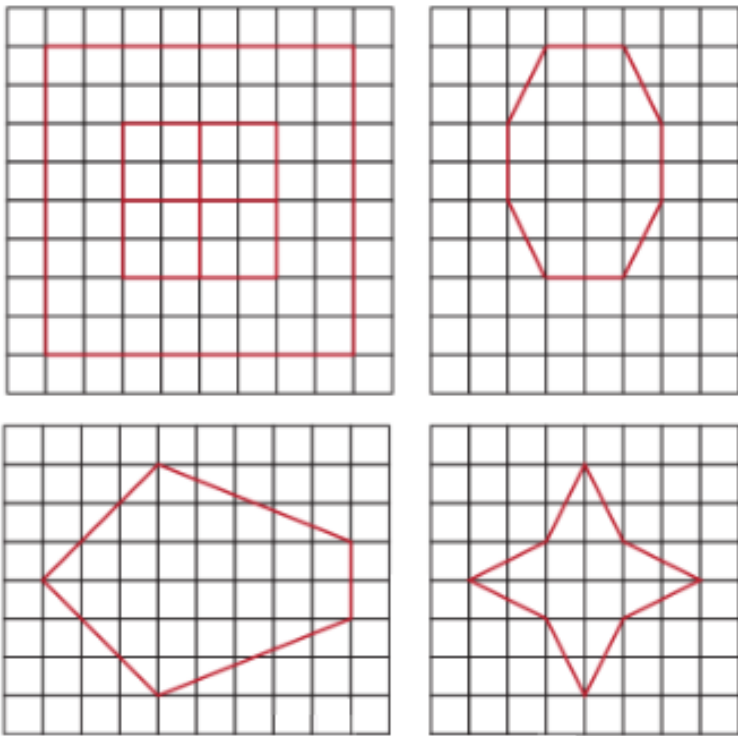
92. Given the line(s) of symmetry, find the other hole(s).



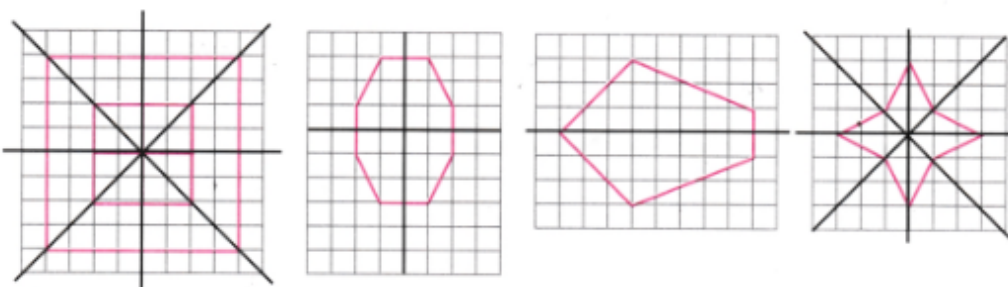
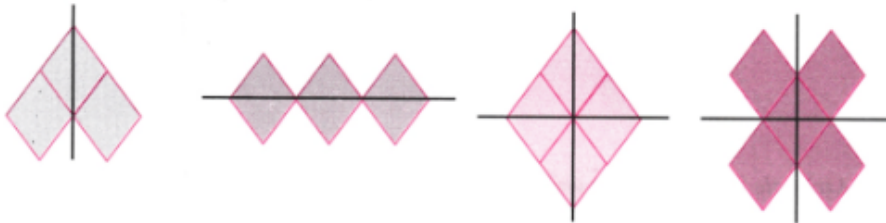
Ans. :



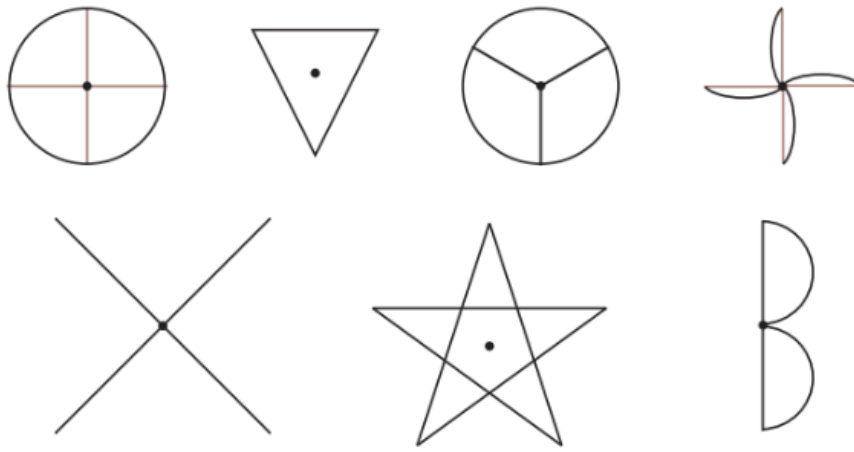
93. Trace each figure and draw the lines of symmetry, if any:



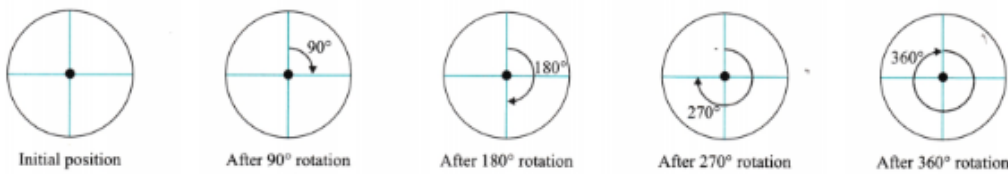
Ans. :



94. Which of the following figures have more than one angle of symmetry?



Ans. :



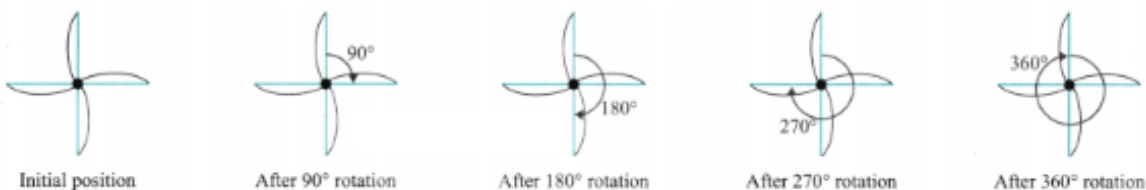
The given figure comes back to its original shape when we rotate it about 90° , 180° , 270° and 360° . Thus, the given figure has 4 angles of symmetry (90° , 180° , 270° and 360°).



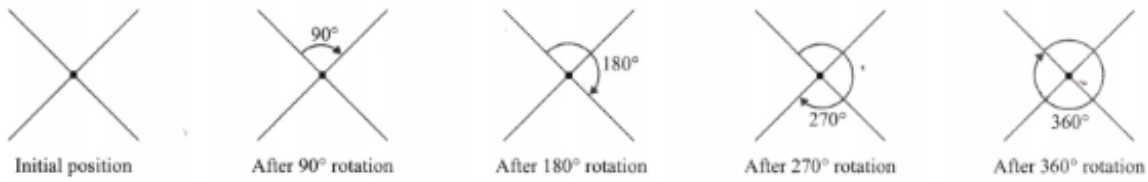
The figure comes back to its original shape only after 360° rotation. So, the figure has only one angle of symmetry i.e., 360° .



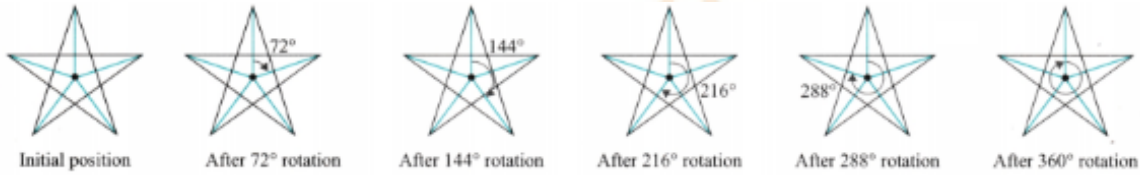
The given figure comes back to its original shape when we rotate it about 120° , 240° and 360° . Thus, the given figure has 3 angles of symmetry (120° , 240° and 360°).



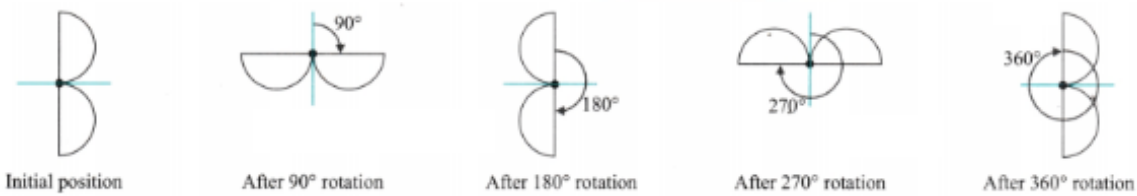
The given figure comes back to its original shape when we rotate it about 90° , 180° , 270° and 360° . Thus, the given figure has 4 angles of symmetry (90° , 180° , 270° and 360°).



The given figure comes back to its original shape when we rotate it about 90° , 180° , 270° and 360° . Thus, the given figure has 4 angles of symmetry (90° , 180° , 270° and 360°).

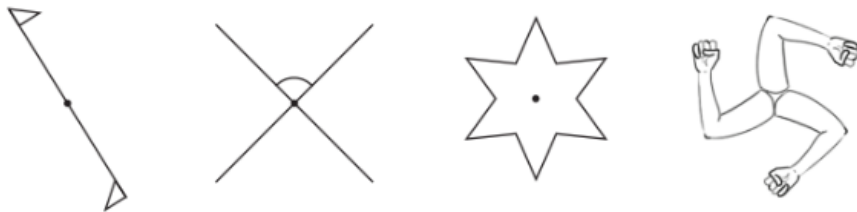


The given figure comes back to its original shape when we rotate it about 72° , 144° , 216° , 288° and 360° . Thus, the given figure has 5 angles of symmetry (72° , 144° , 216° , 288° and 360°).

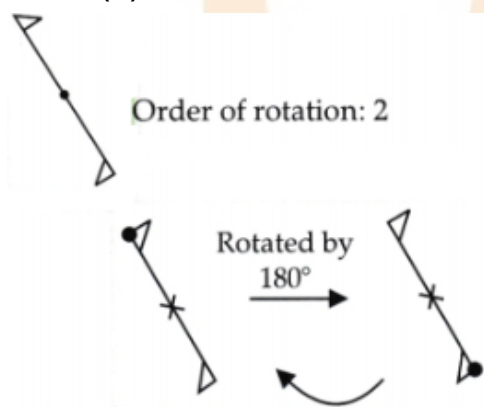


The given figure comes back to its original shape when we rotate it about a complete turn, i.e., at 360° . Thus, the figure does not have

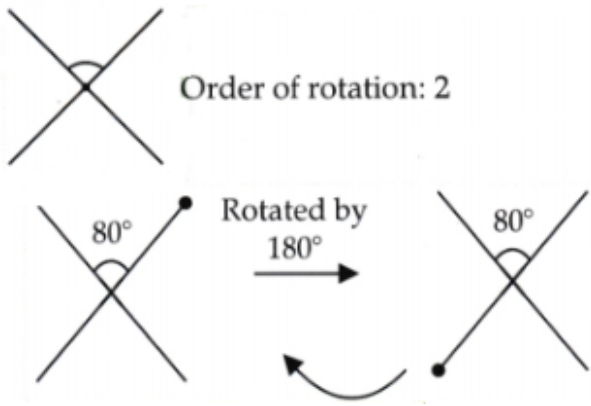
95. Give the order of rotational symmetry for each figure:



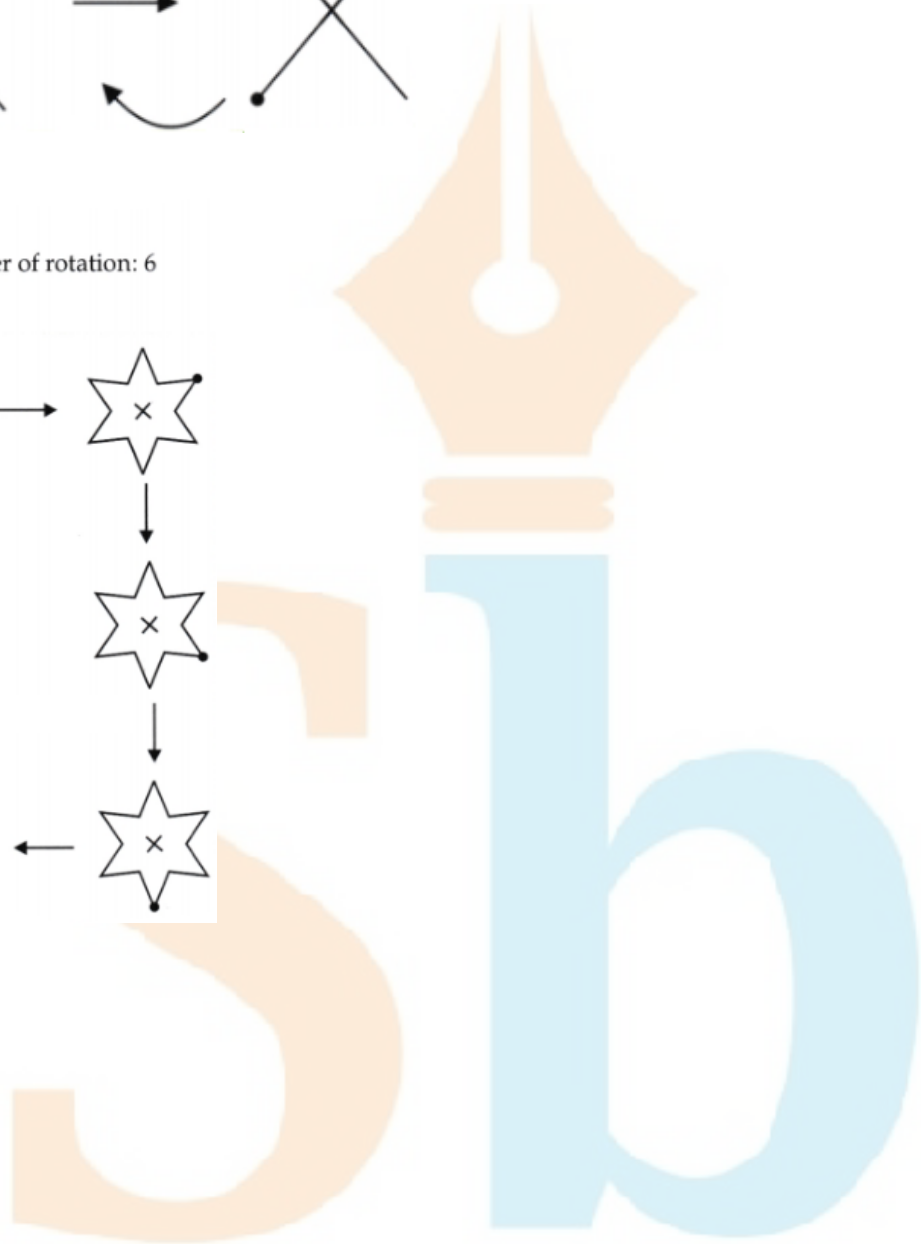
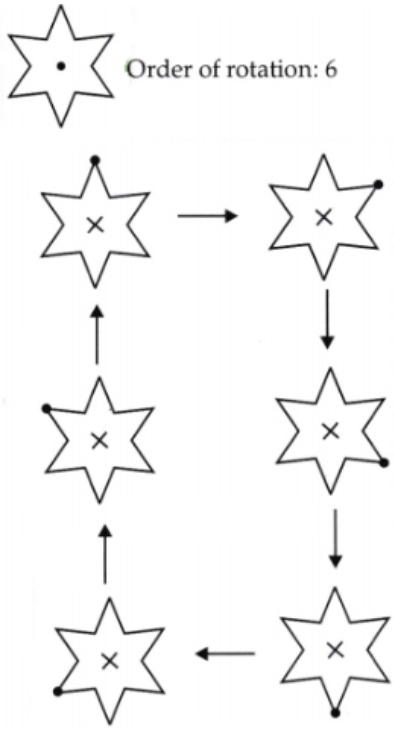
Ans. : (a)



(b)

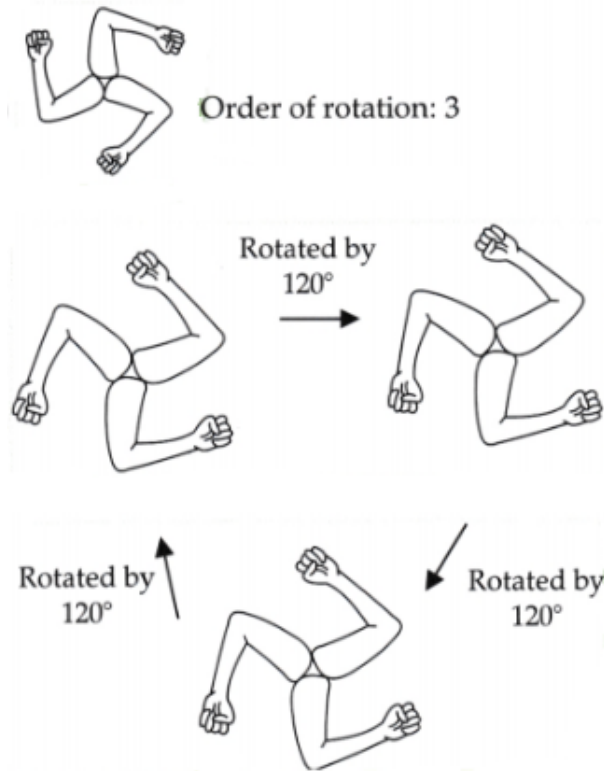


(c)



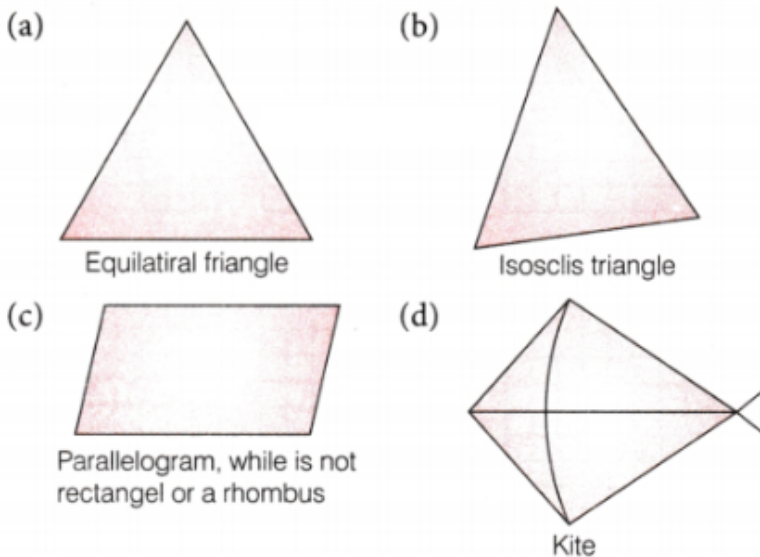
Student Bro

(d)



96. Draw wherever possible, a rough sketch of
- (a) a triangle with atleast two lines of symmetry and atleast two angles of symmetry.
 - (b) a triangle with only one line of symmetry but not having rotational symmetry.
 - (c) a quadrilateral with rotational symmetry but no reflection symmetry.
 - (d) a quadrilateral with reflection symmetry but not having rotational symmetry.

Ans. :



97. This is a picture of the new Parliament Building in Delhi.

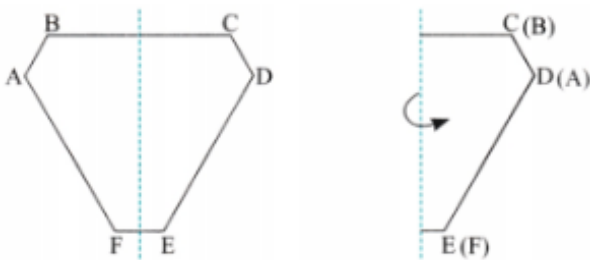


(a) Does the outer boundary of the picture have reflection symmetry? If so, draw the lines of symmetries. How many are they?

(b) Does it have rotational symmetry around its centre?

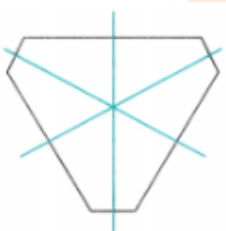
If so, find the angles of rotational symmetry.

Ans. : (a) Let us label the given figure and check whether its one side overlaps the other side when folded it about the dotted line drawn in the middle of the figure.



We observe that one half covers exactly the other half. Thus, it has a reflection symmetry.

Lines of symmetry:



There are three lines of symmetry.

(b) The given figure has rotational symmetry around its centre. When we rotate it about 120° , 240° and 360° , we get the original shape. Thus, the angles of rotational symmetry are 120° , 240° and 360° .

* Match the following.

[4]

98.	Column A	Column B
	(a) Number of lines of symmetry in a circle.	(i) Three
	(b) Number of lines of symmetry in an equilateral triangle.	(ii) Four
	(c) Number of lines of symmetry in an isosceles triangle.	(iii) Unlimited
	(d) Number of lines of symmetry in a square.	(iv) One

Ans. :

	Column A	Column B
	(a) Number of lines of symmetry in a circle.	(iii) Unlimited
	(b) Number of lines of symmetry in an equilateral triangle.	(i) Three

(c) Number of lines of symmetry in an isosceles triangle.	(iv) One
(d) Number of lines of symmetry in a square.	(ii) Four

