MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

REFLECTION AND ROTATIONAL SYMMETRY

Examples

1. A line segment is symmetrical about its perpendicular bisector.True or false?

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2. A given angle having equal arms is symmetrical about the bisector of the angle.

In Fig. 2, $\angle AOB$ is a given angle in which OA=OB and OC is the bisector of $\angle AOB$ Then,

$\angle AOB$ is symmetrical about OC.

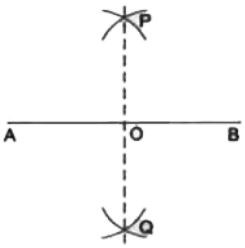

Fig. 1

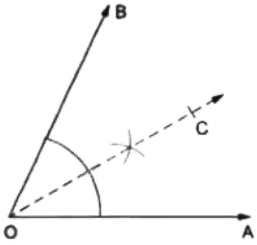

Fig. 2

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3. An isosceles triangle is symmetrical about the bisector of the angle included between the equal sides. In Fig. 3, $\triangle ABC$ is given in which AB =AC and AD is the bisector of $\angle BAC$

Then, AD is the line of symmetry of $\triangle ABC$ .true or false?

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4. Let ABCD be a kite in which AB =AD and BC=DC.Then, kite ABCD is symmetrical about the diagonal AC .true or false?

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5. A semicircle ACB has one line of symmetry,namely the perpendicular bisector of diameter AB. true or false?

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6. Let ABCD be an isosceles trapezium in which AB||DC and AD=BC. Let E and F be the midpoints of AB and DC respectively.Then trap.ABCD symmetrical about EF.true or false?

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7. A rectangle has two lines of symmetry, each one of which is the line joining the midpoints of opposite sides.true or false?

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8. A rhombus is symmetrical about each one of its diagonals. true or false?

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9. A square has 4 lines of symmetry, namely the diiagonals and the lines joining the midpoints of its opposite sides. true or false?

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10. An equilateral triangle is symmetrical about each one of the bisectors of its interior angles. true or false?

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11. A circle is symmetrical about one of its diameters. True or False

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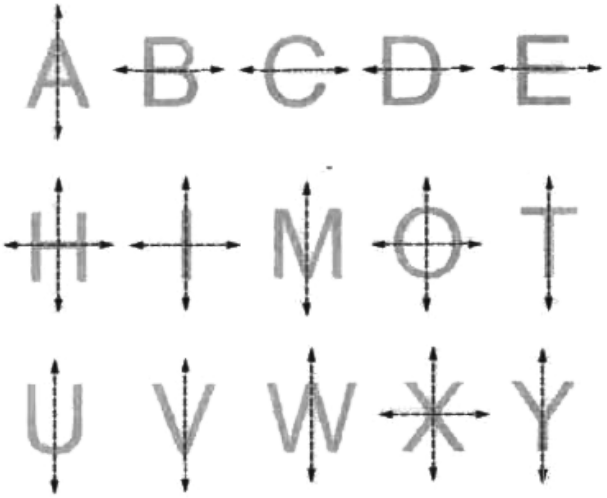
12. Which of the following capital letters of the English alphabet is symmetrical about the

dotted line or lines as shown.



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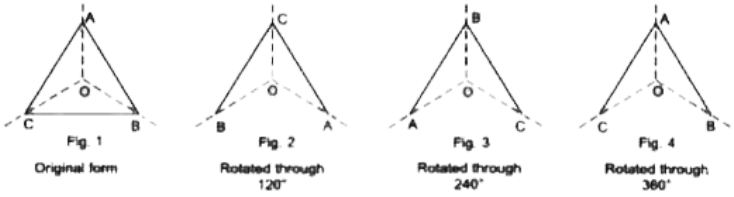
13. Let us rotate an equilateral $\triangle ABC$(given in Fig.1) through 120°,240° and 360° to attain the positions shown in Fig.2, Fig.3, Fig.4

respectively.



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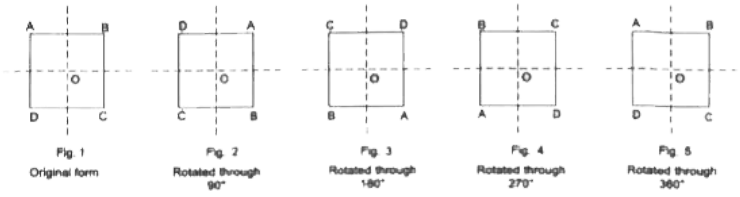
14. Let us rotate a square ABCD (given in Fig.1) through $90^\circ, 180^\circ, 270^\circ$ and 360° to attain the positions shown in Fig.2, Fig.3, Fig.4 and Fig.5 respectively.



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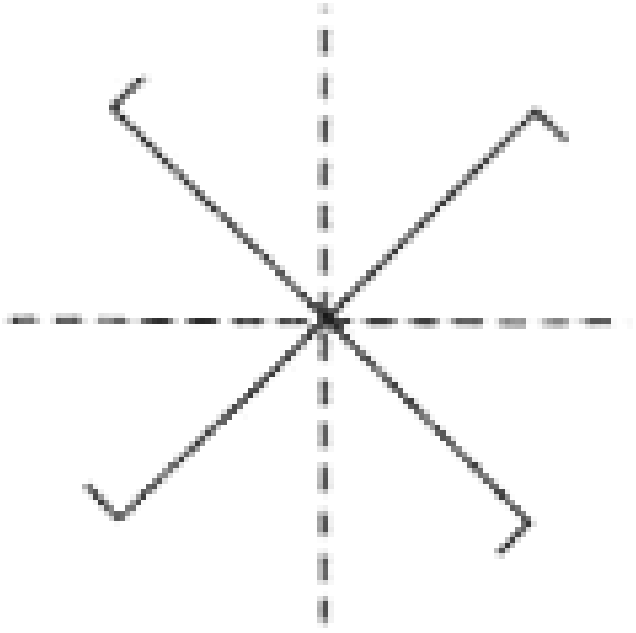
15. If we rotate the adjoining figure through $90^\circ, 180^\circ, 270^\circ$ and 360° then each time the figure will fit exactly onto itself.Thus, the given figure has a rotational symmetry of order 4.



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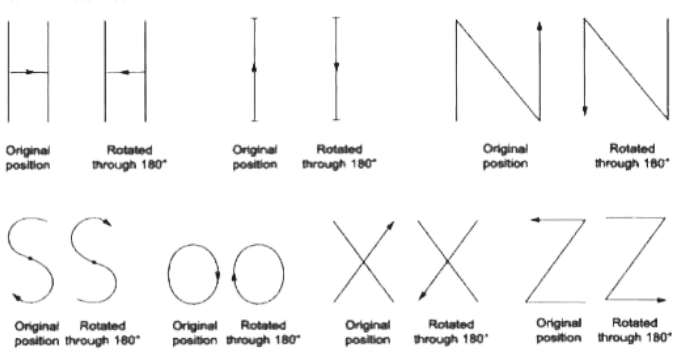
16. Each of the letters H,I,N,O,S,X and Z has a rotational symmetry of order 2, since each one of these letters when rotated through 180° and 360° will fit exactly onto itself each time.



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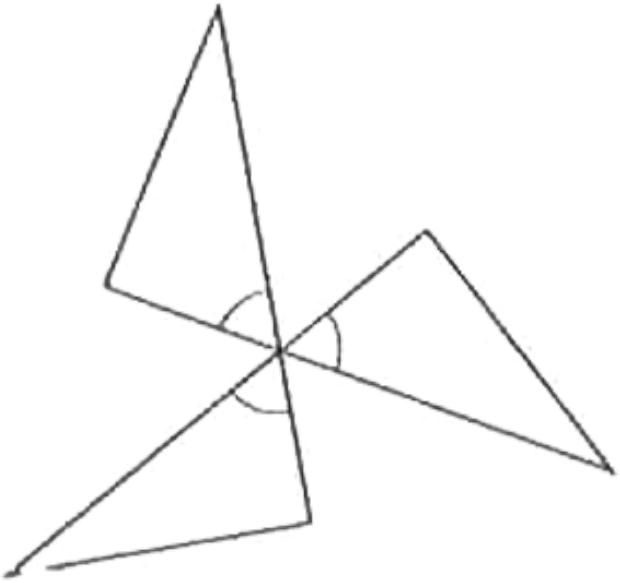
17. The adjoining figure when rotated through $120^\circ, 240^\circ$ and 360° will fit exactly onto itself each time. So, it has a rotational symmetry of order 3.

(i)Rotating a figure through90° clockwise is the same as rotating it anticlockwise through 270°.

(ii)Rotating a figure through180° clockwise is the same as rotating it anticlockwise through

180°.



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18. A square has 4 lines of symmetry, namely the diiagonals and the lines joining the

midpoints of its opposite sides.Also a square has rotataional symmetry of order 4,when rotated through 90°, 180°, 270° and 360°.

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19. A rectangle has two lines of symmetry, each one of which is the line joining the midpoints of opposite sides.Also a rectangle has rotational symmetry of order 2, when rotated through 180° and 360°.

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20. An equilateral triangle has 3 lines of symmetry , namely, the bisectors of its interior angles .Also an equilateral triangle has rotational symmetry of order 3, when rotated through 120°, 240° and 360°

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21. The letter H has two linesof symmetry. Also, H has rotational symmetry of order 2, when roatated through 180° and 360°.Similarly, the

letter I has two lines of symmetry and rotational symmetry of order 2.Similarly,each of the letters O and X has two lines of symmetry and rotational symmetry of order 2.

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22. An isosceles triangle has a line of symmetry but does not have rotational symmetry. true or false?

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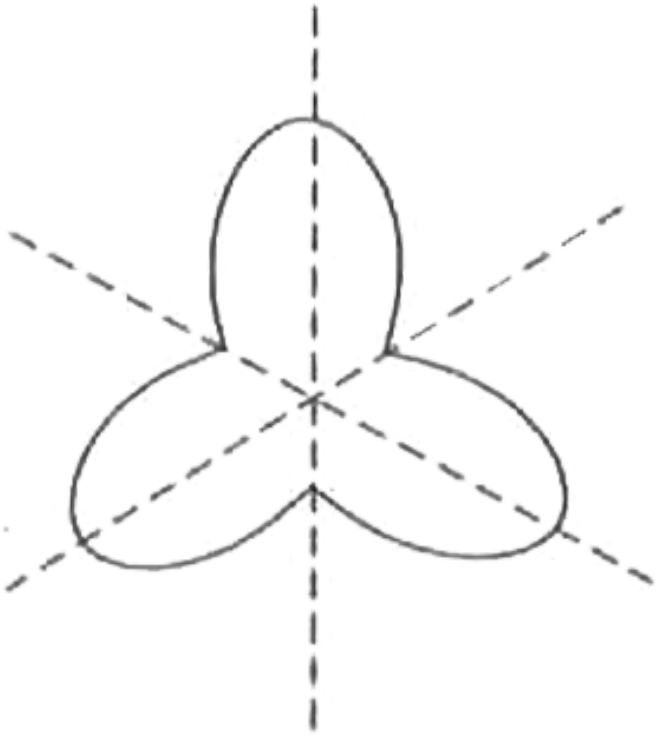
23. Look at the adjoining figure.It has three lines of symmetry (shown by dotted lines).Also it has rotational symmetry of order 3 when rotated through 120°, 240° and 360°.



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Exercise A Mcq

1. A Scalene triangle has

A. no line of symmetry

B. one line of symmetry

C. two lines of symmetry

D. three lines of symmetry

Answer: A

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2. A rectangle is symmetrical about

A. each one of its sides

B. each one of its diagonals

C. a line joining the midpoints of its opposite sides

D. none of these

Answer: C

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3. A square has

A. one line of symmetry

B. two lines of symmetry

C. three lines of symmetry

D. four lines of symmetry

Answer: D

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4. A rhombus is symmetrical about

A. the line joining the midpoints of its opposite sides

B. each of its diagonals

C. perpendicular bisector of each of its sides

D. none of these

Answer: B

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5. A circle has

A. no line of symmetry

B. one line of symmetry

C. two lines of symmetry

D. an unlimited number of lines of symmetry.

Answer: D

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6. In $\triangle ABC$, $AB = AC$ and $AD \perp BC, BE \perp AC$ and $CF \perp AB$. Then $\triangle ABC$ is symmetrical about

A. AD

B. BE

C. CF

D. None of these

Answer: A

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7. A kite has one line of symmetry. true or false?

A. the diagonal AC

B. the diagonal BD

C. none of these

D. All of the above

Answer: A

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8. The letter O of the English alphabet has

A. no line of symmetry

B. one line of symmetry

C. two lines of symmetry

D. none of these

Answer: C

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9. The letter Z of the English alphabet has

A. no line of symmetry

B. one line of symmetry

C. two lines of symmetry

D. none of these

Answer: A

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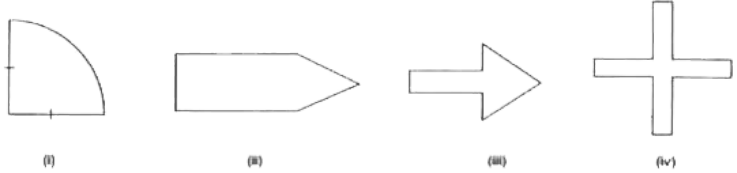
10. Draw the line (or lines) of symmetry of each of the following figures.



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Exercise A True False

1. Which of the following staements are true and which of them are false?

(i)A parallelogram has no line of symmetry.

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2. Which of the following staements are true and which of them are false?

(ii)An angle with equal arams has its bisector as the line of symmetry.

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3. Which of the following staements are true and which of them are false?(iii)An equilateral triangle has three lines of symmetry.

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4. Which of the following staements are true and which of them are false?

(iv)A parallelogram has four lines of symmetry.

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5. Which of the following staements are true and which of them are false?

(v)A square has four lines of symmetry.

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6. Which of the following staements are true and which of them are false?

(vi)A rectangle has two lines of symmetry.

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7. Which of the following staements are true and which of them are false?

(vii)Each one of the letters H,I,O,X of the English alphabet has two lines of symmetry.

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Exercise B

1. (i)How many lines of symmetry does an equilateral triangle have?

(ii)What is the order of rotational symmetry of an equilateral triangle?

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2. Through what different angles should a rectangle be rotated to be in symmetrical position with the original position?

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3. Discuss the rotational symmetry of a square. Also, determine its lines of symmetry.

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4. (i)How many lines of symmetry does a rhombus have?

(ii)What is the order of rotational symmetry of a rhombus?

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5. Give an example of a letter of the English alphabet which has (i) No line of symmetry (ii) Rotational symmetry of order 2.

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6. Give an example of a figure that has a line of symmetry but does not have rotational symmetry.

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7. Does every trapezium have a line of symmmetry?

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8. What is the line of symmetry of a semi-circle? Does it have rotational symmetry?

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9. Give an example of a geometrical figure which has neither a line of symmetry nor a rotational symmetry.

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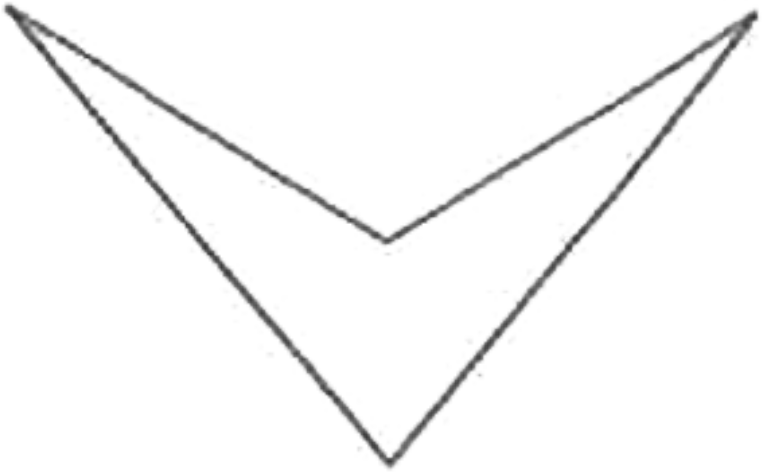
10. Find

(i) the number of lines symmetry and

(iI) the order of rotational symmetry of thr

adjoining figure.Draw the line of symmetry.



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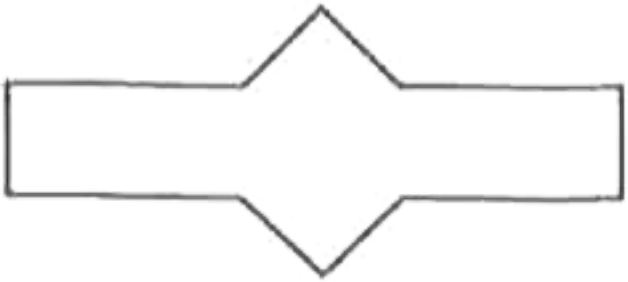
11. (i)How many lines of symmetry does the given figure have?Draw these lines.

(ii)what is the order of rotational symmetry of

the given figure?



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12. Give an example of a letter of the English alphabet which has (i) No line of symmetry (ii) Rotational symmetry of order 2.

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