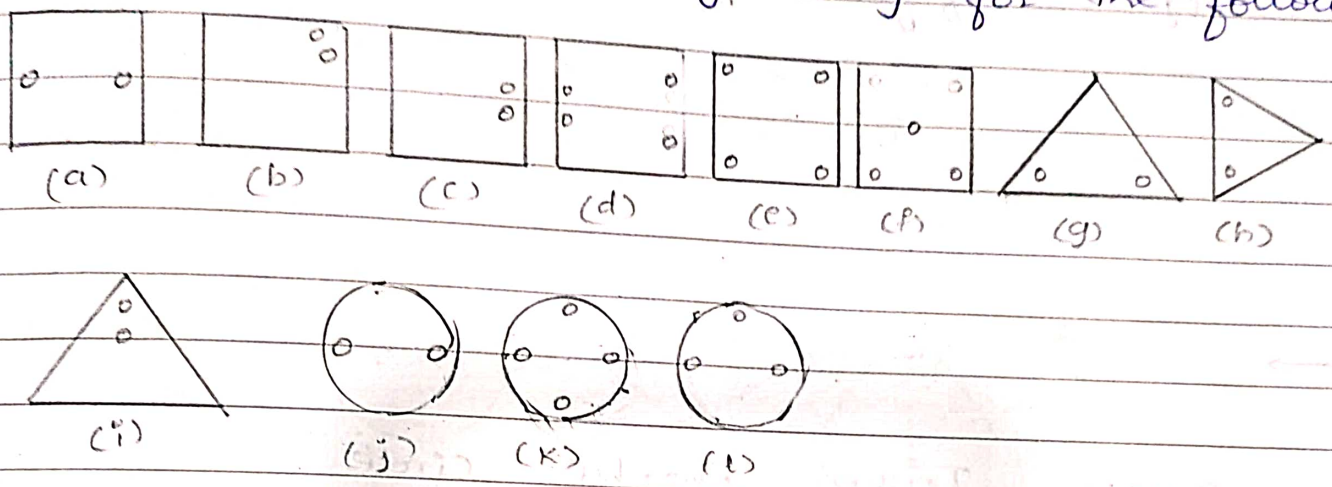
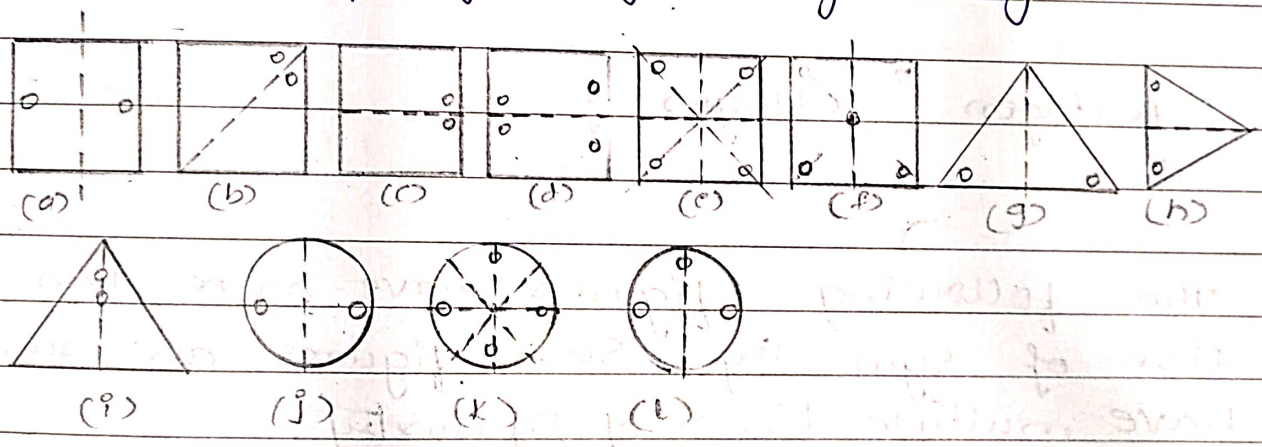
CHAPTER - 14
SYMMETRY

Exercise 14.1

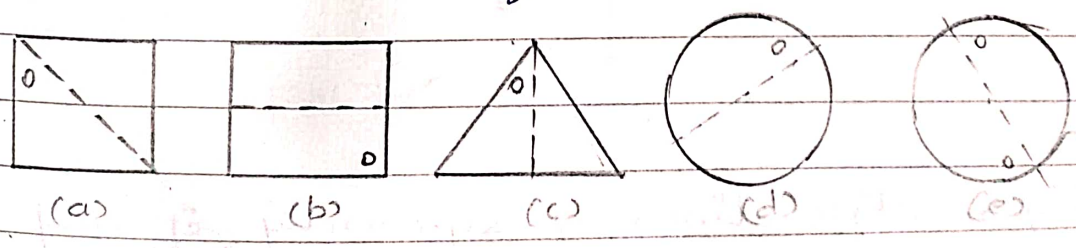
Q1. Copy the figures with punched holes and find the axis of symmetry for the following:



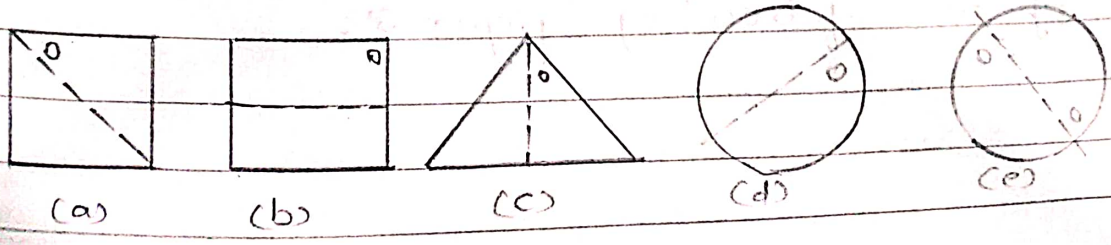
→ The axis of symmetry is given by.



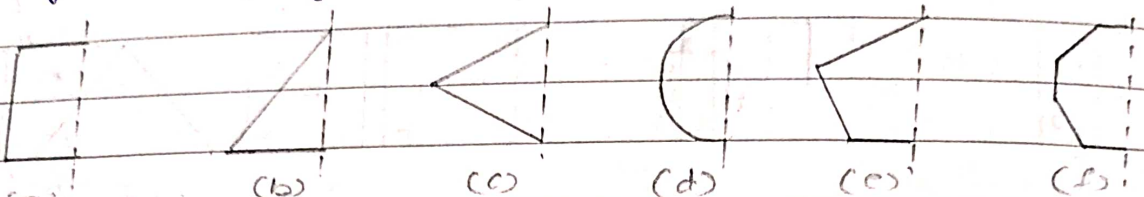
Q2. Given the lines of symmetry, find the other hole.



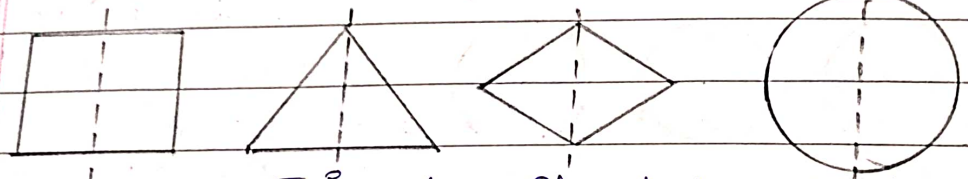
→



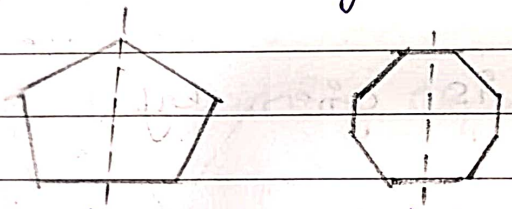
Q3. In the following figures, the mirror line is given as a dotted line. Complete each figure performing reflection in the dotted line. Are you able to recall the name of the figure you complete?



→

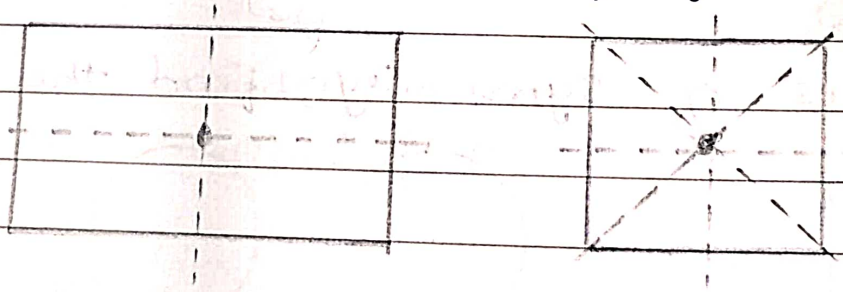


Square Triangle Rhombus Circle

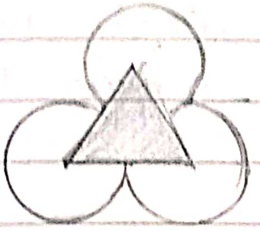


Pentagon Octagon

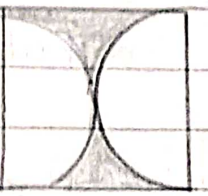
Q4. The following figures have more than one line of symmetry. Such figures are said to have multiple lines of symmetry.



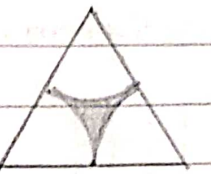
Identify multiple lines of symmetry, if any, in each of the following figures:



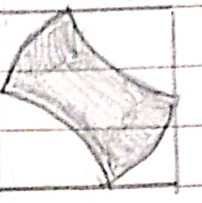
(a)



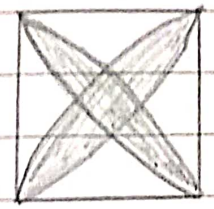
(b)



(c)

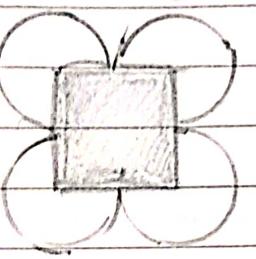


(d)

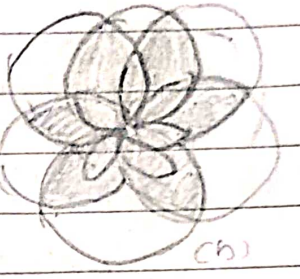


(e)

(f)



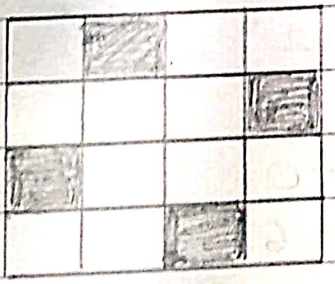
(g)

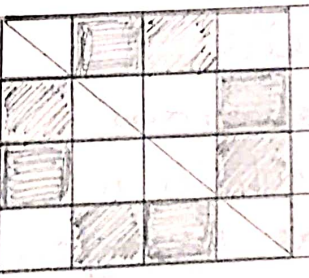


(h)

→ Figures a, b, c, d, e, f, g, h have multiple lines of symmetry.

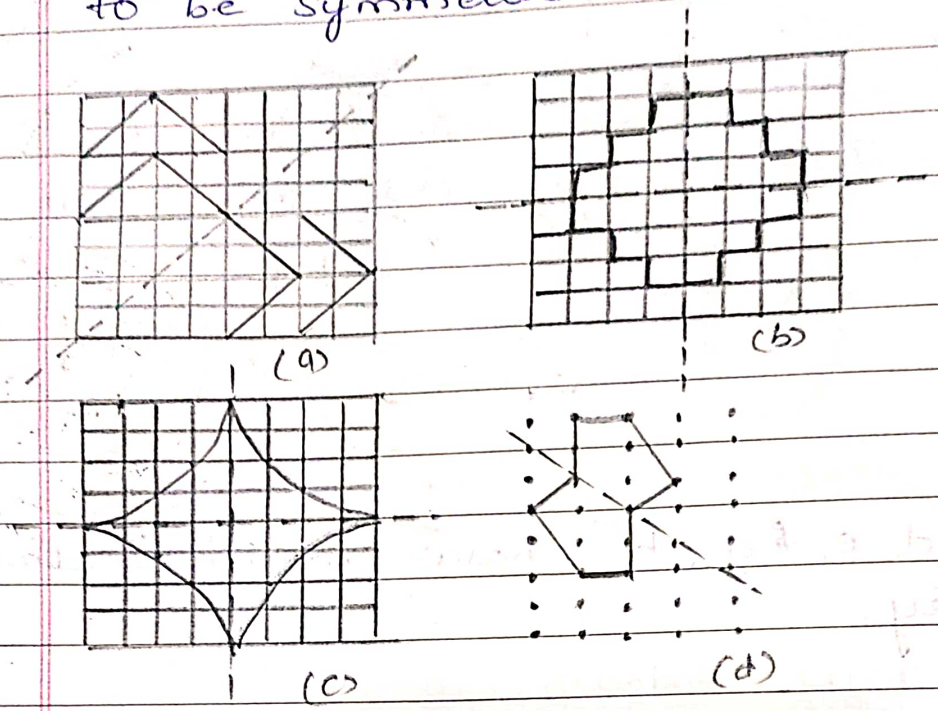
Q5. Copy the figure given here.
Take any one diagonal as a line of symmetry & shade a few more squares to make the figure symmetric about a diagonal.
Is there more than one way to do that?
Will the figure be symmetric about both the diagonals?





Yes, there are more than one line of symmetry.
Yes, the figure is symmetric about both the diagonals.

Q6. Copy the diagram & complete each shape to be symmetric about the mirror line(s).



Q7. State the number of lines of symmetry for the following figures:

(a) An equilateral triangle – 3
(b) An isosceles triangle – 1
(c) A scalene triangle – 0
(d) A square – 4
(e) A rectangle – 2
(f) A rhombus. – 2
(g) A parallelogram – 0
(h) A quadrilateral – 0
(i) A regular hexagon – 6
(j) A circle. – Infinite.

Q9. Give three examples of shape with no line of symmetry.

→ 1. Scalene triangle
2. Quadrilateral.
3. Letter R.

Q8. What letters of the English alphabet have reflectional symmetry. (ie, symmetry related to mirror reflection) about.

(a) a vertical mirror

→ Alphabet of vertical mirror reflection symmetry are : A, H, I, M, O, T, U, V, W, X, Y.

(b) a horizontal mirror

→ Alphabet of horizontal mirror reflection symmetry are : B, C, D, E, H, I, K, O, X.

(c) both horizontal & vertical mirrors

→ Alphabet of both horizontal & vertical mirror reflection symmetry are : H, I, O, X.

Q10. What other name can you give to the line of symmetry of

(a) an isosceles triangle ?

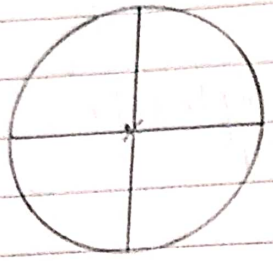
(b) a circle ?

→ (a) Median of an isosceles triangle is its line of symmetry.

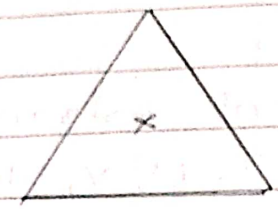
(b) Diameter of a circle is its line of symmetry

EXERCISE 14.2

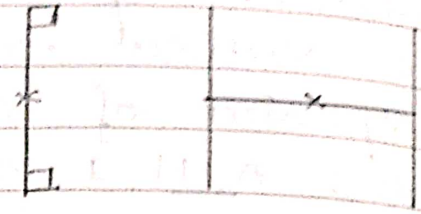
Q1. Which of the following figures have rotational symmetry of order more than 1:



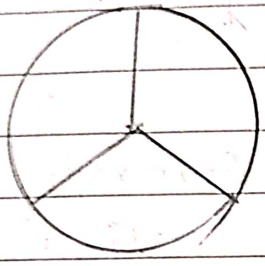
(a)



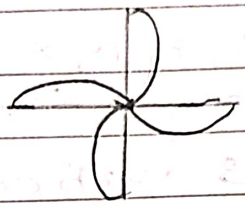
(b)



(c) (d)



(e)



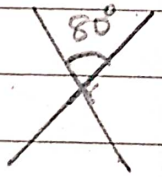
(f)

→ Here figures a, b, d, e, f have rotational symmetry more than 1.

Q2. Give the order of rotational symmetry for each figure:

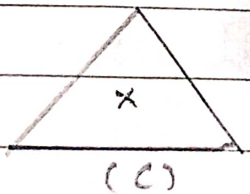
(a)

Order of symmetry is 2



(b)

Order of symmetry is 2

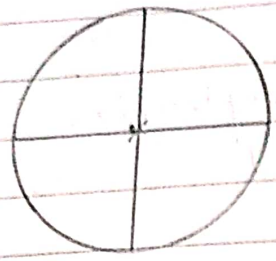


(c)

Order of symmetry is 3.

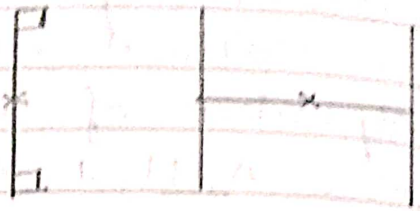
EXERCISE 14.2

Q1. Which of the following figures have rotational symmetry of order more than 1?

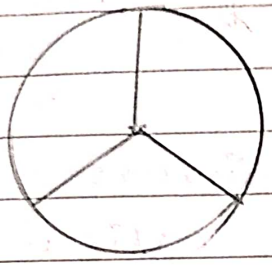


(a)

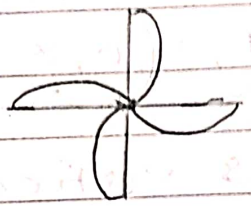
(b)



(c) (d)



(e)



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Q2. Give the order of rotational symmetry for each figure:

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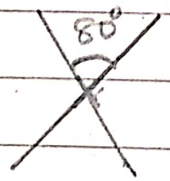
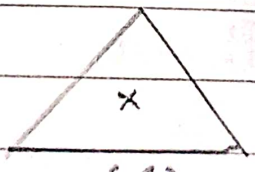


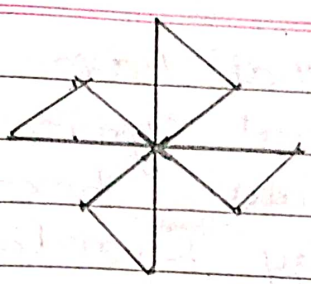
(b)

Order of symmetry is 2



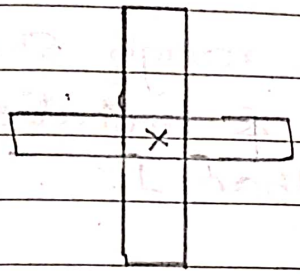
(c)

Order of symmetry is 3



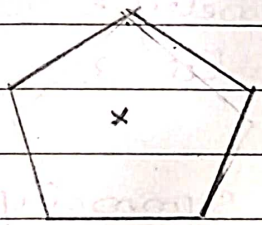
(d)

Order of symmetry is 4



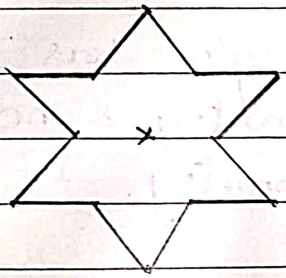
(e)

Order of rotational symmetry is 4.



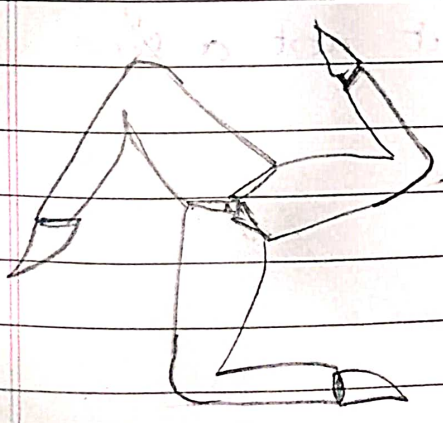
(f)

Order of rotational symmetry is 5



(g)

Order of rotational symmetry is 6



(h)

Order of rotational symmetry is 3.

EXERCISE 14·3

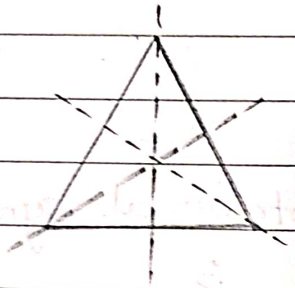
Q1. Name any two figures that have both line symmetry & rotational symmetry.

→ Equilateral triangle & regular hexagon have both line of symmetry & rotational symmetry.

Q2. Draw, wherever possible, a rough sketch of

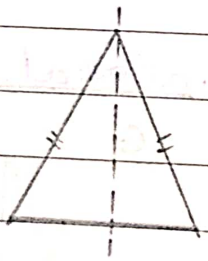
(i) a triangle with both line & rotational symmetries of order more than 1

→



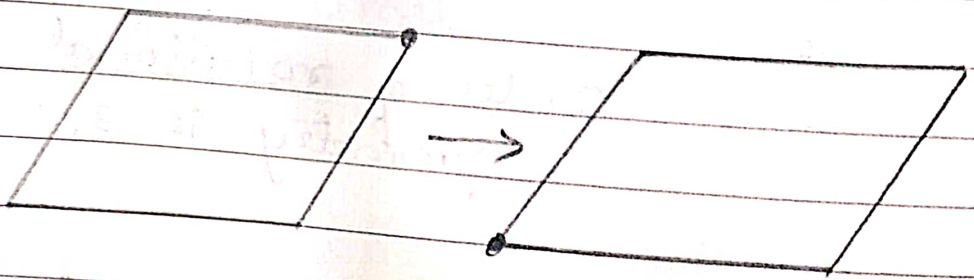
An equilateral triangle has 3 lines of symmetry & rotational symmetry order 3.

(ii) a triangle with only lines symmetry & no rotational symmetry of order more than 1.

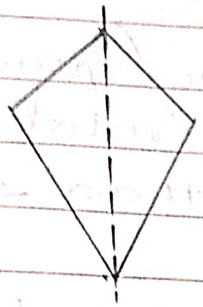


An isosceles triangle has only 1 line of symmetry & no rotational symmetry.

(iii) a quadrilateral with a rotational symmetry of order more than 1 but not a line symmetry.



(iv) a quadrilateral with line symmetry but not a rotational symmetry of order more than 1.



Rhombus is a quadrilateral with line of symmetry but not a rotational symmetry of order more than 1.

Q3. If a figure has two or more lines of symmetry, should it have rotational symmetry of order more than 1?

→ Yes, if a figure has two or more lines of symmetry then it will have rotational symmetry of order more than 1.

Q4. Fill in the blanks:

Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
Square	Intersecting point of diagonal	4	90°
Rectangle	Intersecting point of diagonal	2	180°
Rhombus	Intersting pt of diagonal	2	180°
Equilateral Triangle	Intersecting pt of medians	3	120°
Regular Hexagon	Intersecting pt of diagonal	6	60°
Circle	centre	Infinite	Every angle
Semi-circle	Mid point of diameter	1	360°

Q5. Name the quadrilateral which have both line symmetry & rotational symmetry of order more than 1.

→ Square & rectangles are two quadrilaterals which have both line & rotational symmetry of order more than 1.

Q6. After rotating by 60° about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure?

→ For the angles 120°, 180°, 240°, 300°, 360° a figure looks exactly the same as its original position after rotating by 60° about a centre.

Q7. Can we have a rotational symmetry of order more than 1 whose angle of rotation is (i) 45° (ii) 17°?

→ (i) Yes, we can have a rotational symmetry of order more than 1 whose angle of rotation is 45°.

(ii) No, we cannot have a rotational symmetry of order more than 1 whose angle of rotation is 17°.