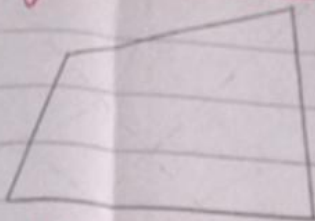
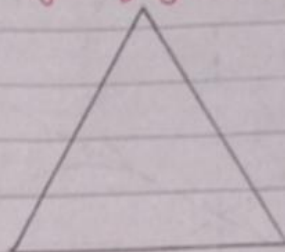


EXERCISE 14.1

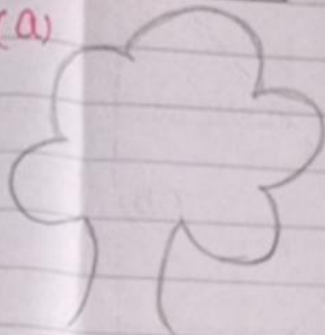
Ques 1. Which of the following figures are asymmetrical?



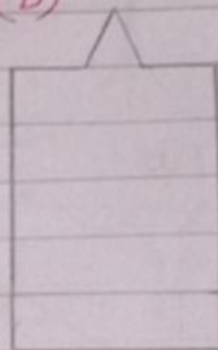
(a)



(b)



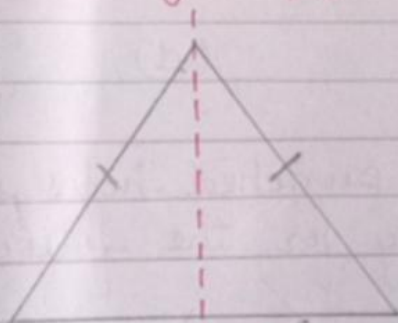
(c)



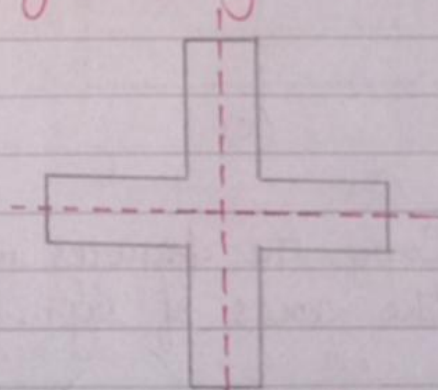
(d)

Ans (a) Asymmetrical (b) Symmetrical
(c) Asymmetrical (d) Symmetrical

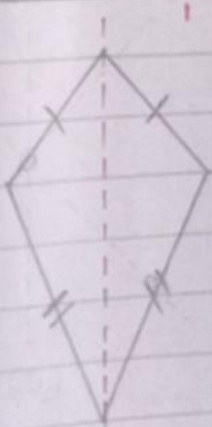
Ques 2. Draw the lines of symmetry in the following figures.



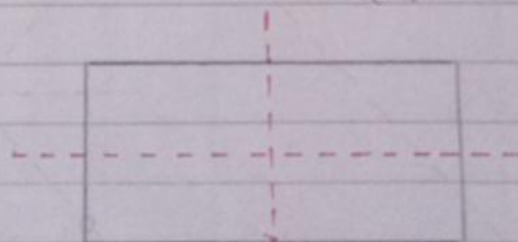
(a)



(b)

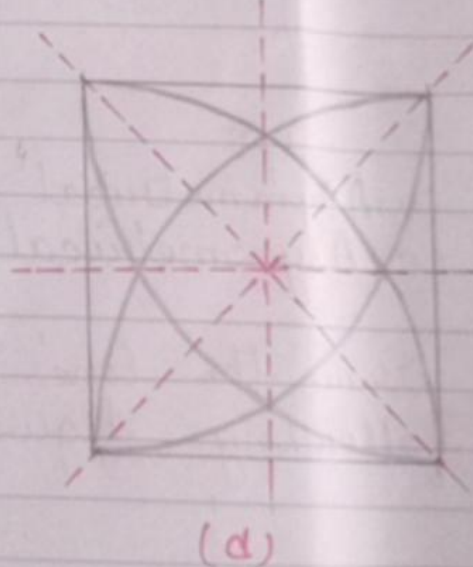
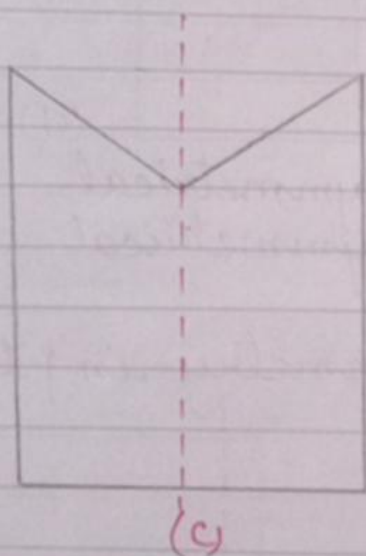
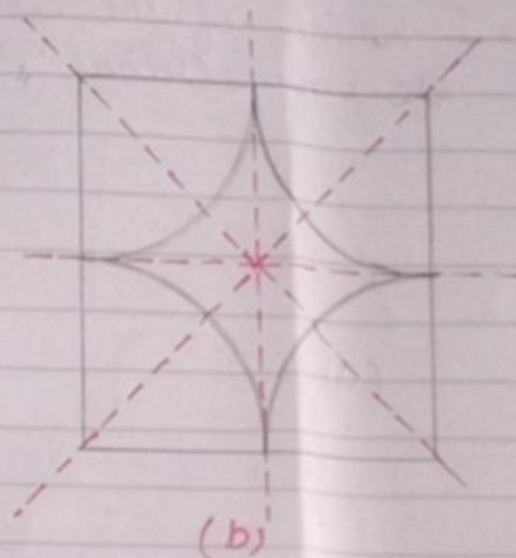
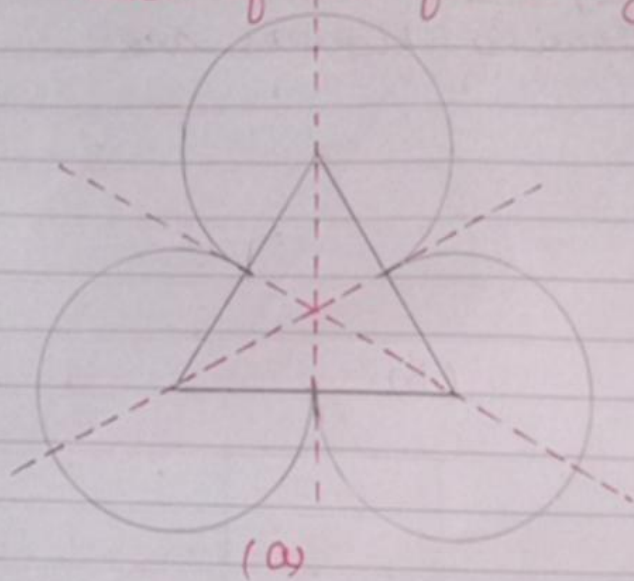


(c)

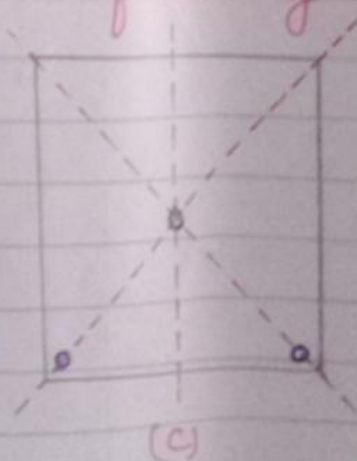
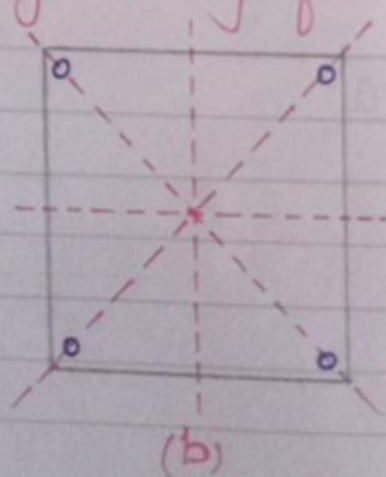
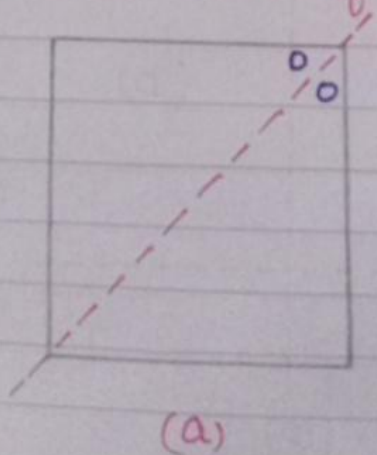


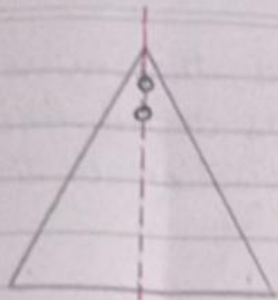
(d)

Ques3 Draw all lines of symmetry if any in each of the following figures.

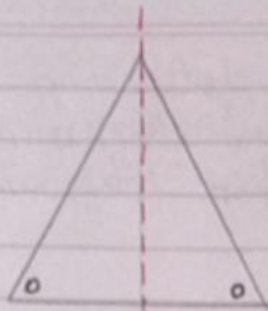


Ques4 Copy the figures with punched holes and find the axes of symmetry for the following.

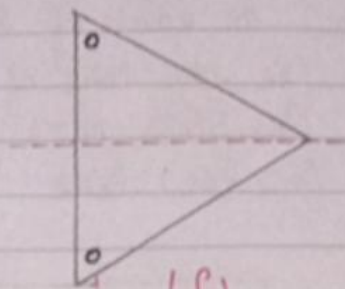




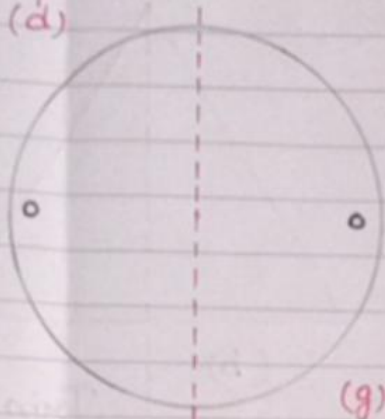
(d)



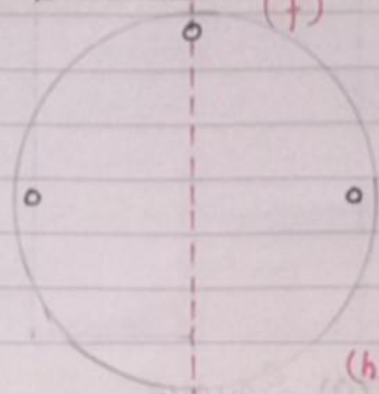
(e)



(f)

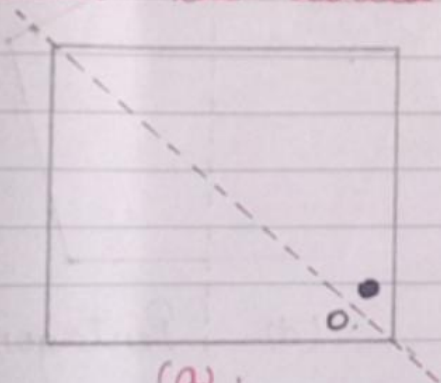


(g)

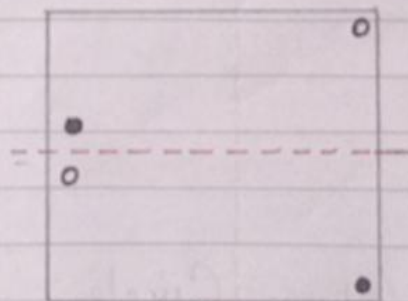


(h)

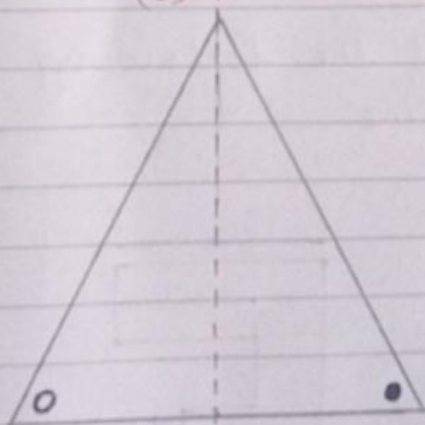
Ques 5 In the following figures mark the missing holes in order to make them symmetrical about the dotted line.



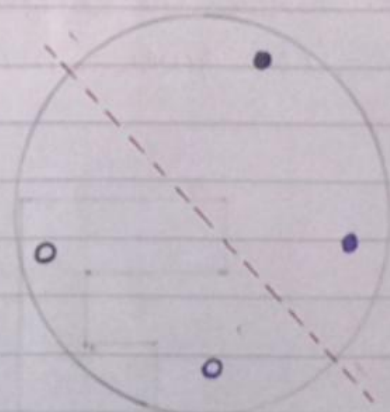
(a)



(b)

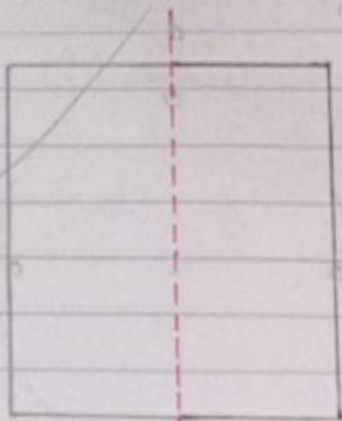


(c)

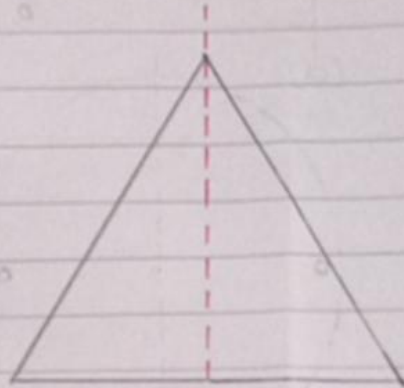


(d)

Ques 6 In each of the following figures, the mirror line (ie the line of symmetry) is given as dotted line. Complete each figure performing reflection in the dotted (mirror) line.

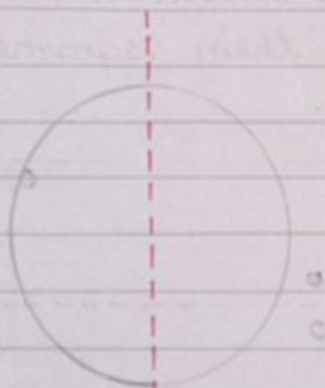


(a) Square

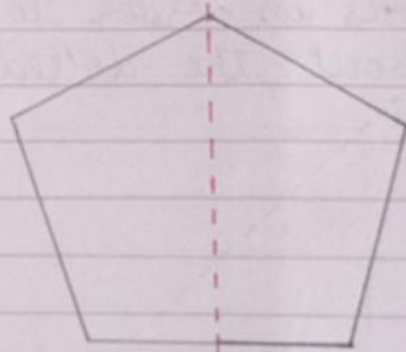


(b)

Triangle



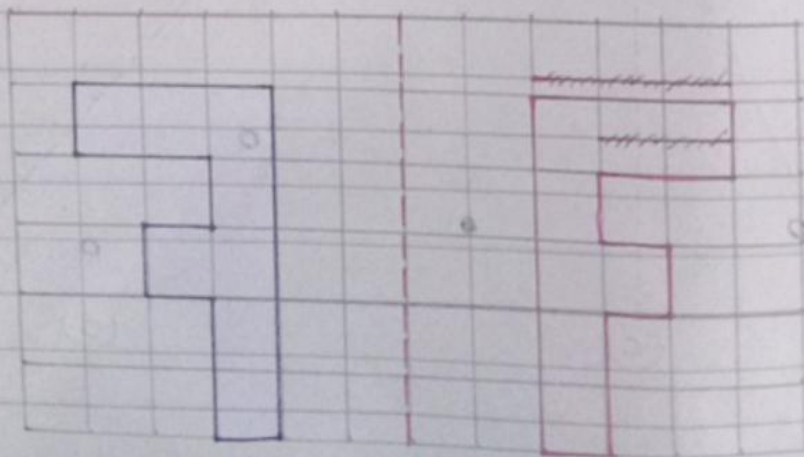
(c) Circle



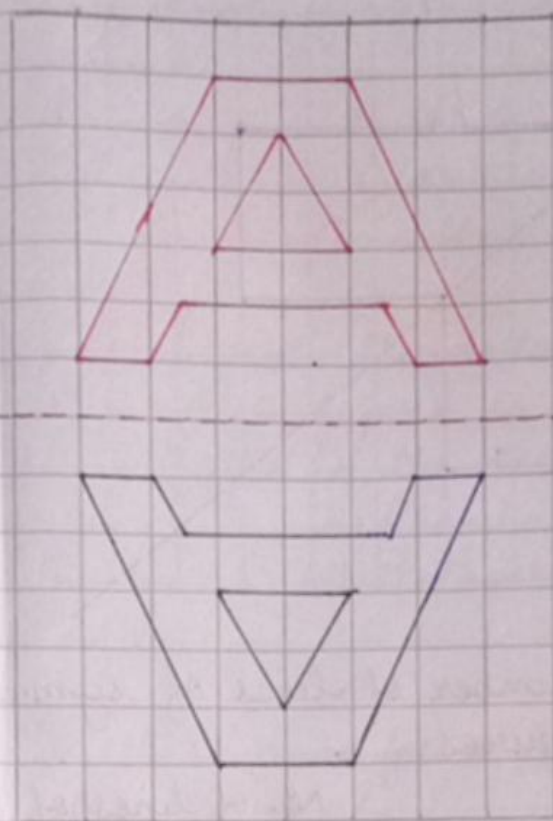
(d) Pentagon

Ques 7. Draw the reflection of the following letter in the given mirror line.

(a)

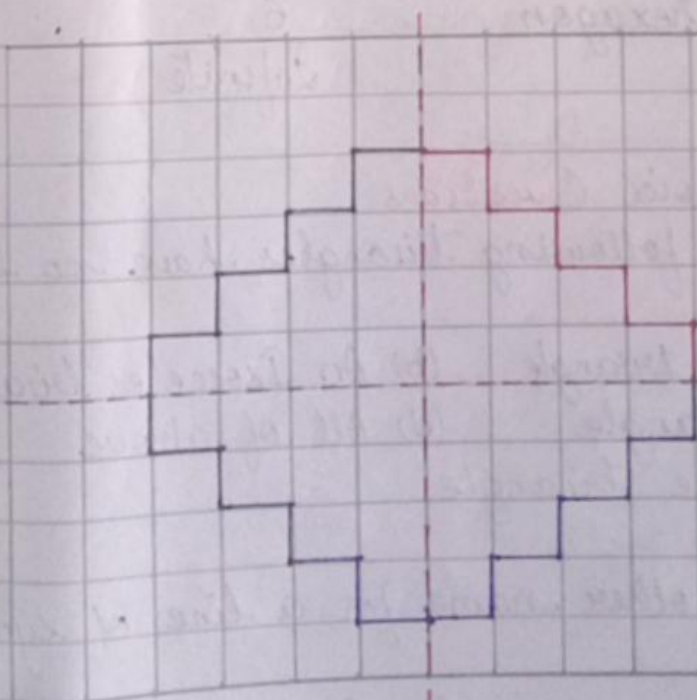


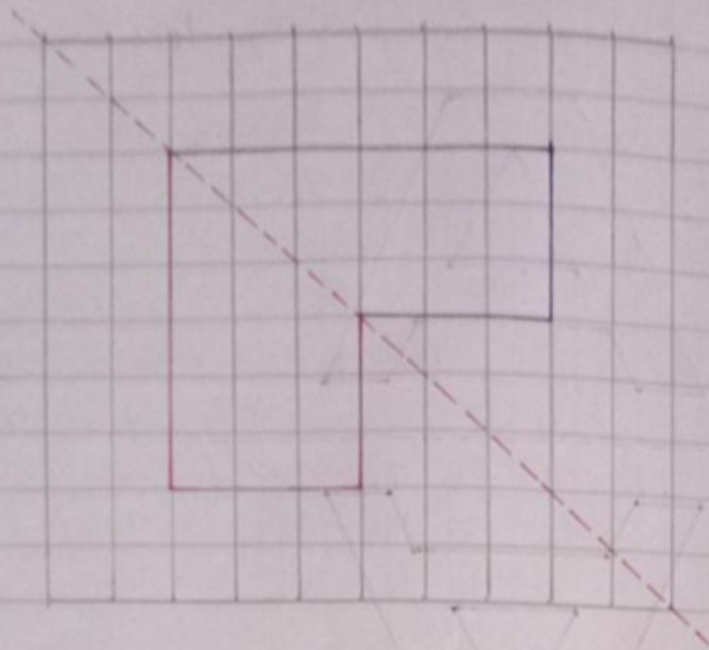
(b)



Ques 8 Copy each diagram on a squared paper and complete each shape to be symmetrical about the mirror lines shown dotted.

(a)





Ques 9 State the number of lines of symmetry for the following figures.

Figure	No. of lines of symmetry
a) A scalene triangle	0
b) A rectangle	2
c) A rhombus	2
d) A parallelogram	0
e) A regular hexagon	6
f) A circle	Infinite

Ques 10 Multiple Choice Questions

(i) Which of the following triangles have no lines of symmetry?

- (a) An equilateral triangle (b) An Isosceles triangle
(c) A scalene triangle (d) All of above

Ans:- (c) A scalene triangle

(ii) What is the other name for a line of symmetry of a circle?

- (a) An arc (b) A sector
(c) A diameter (d) A radius

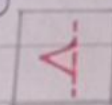
Ans:- (c) A diameter

(iii) How many lines of symmetry does a regular polygon have?

- (a) Infinitely many (b) As many as its sides
(c) One (d) Zero.

Ans:- (b) As many as its sides.

(iv) In the given figure, the dotted line is the line of symmetry which figure is formed if the given figure is reflected in the dotted line



- (a) Square (b) Rhombus
(c) Triangle (d) Pentagon

Ans:- (b) Rhombus

(v) What is other name for a line of symmetry of an Isosceles Triangle?

- (a) Side (b) Median
(c) Radius (d) Angle

Ans:- (b) Median

(vi) Which of the following alphabets has a vertical line of symmetry?

- (a) M (b) Q
(c) E (d) B

Ans:- (a) M

(vii) Which of the following alphabets has a horizontal line of symmetry?

- (a) C (b) D
(c) K (d) All of the above.

Ans:- (d) All of the above

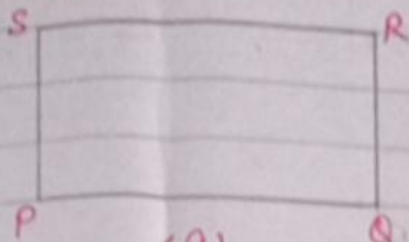
(viii) Which of the following alphabets has no line of symmetry?

- (a) A (b) B
(c) P (d) O

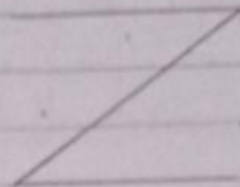
Ans:- (c) P

EXERCISE 14.2

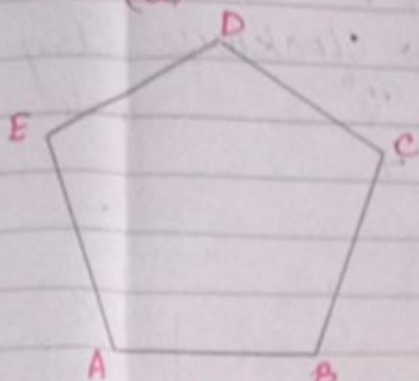
Ques 1. Write the order of rotation for the following figures.



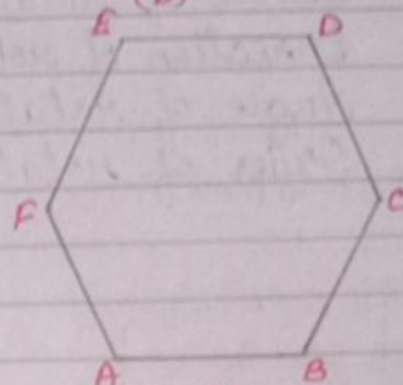
(a)



(b)



(c)



(d)

Ans

Name of the figure

Order of rotation

(a) Rectangle PQRS

2

(b) Alphabet Z

2

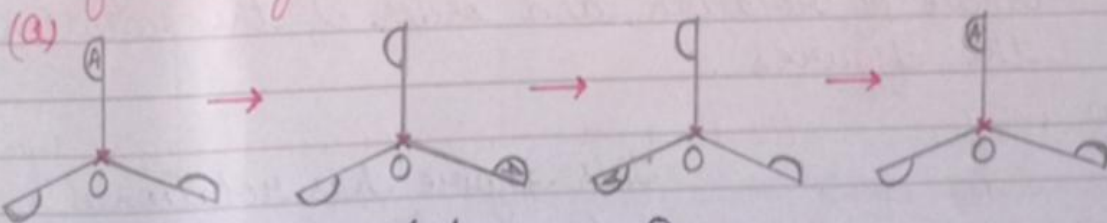
(c) Pentagon ABCDE

5

(d) Hexagon ABCDEF

6

Ques 2. Specify the centre of rotation, direction of rotation, angle of rotation and order of rotation for the following.



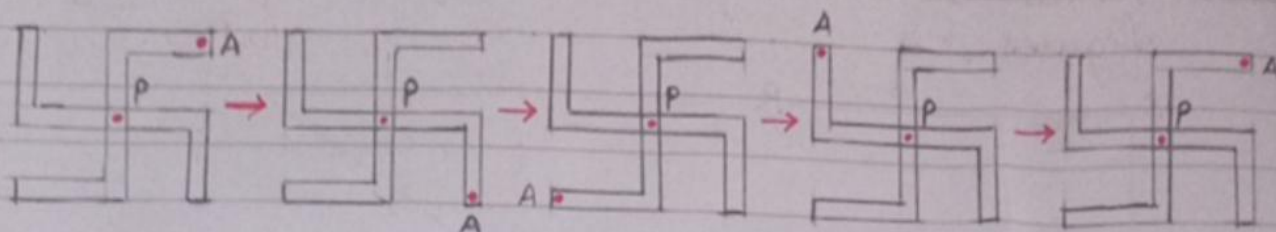
Ans:- Centre of rotation $\rightarrow O$

Direction of rotation $\rightarrow$ Clockwise

Angle of rotation $\rightarrow 120^\circ$

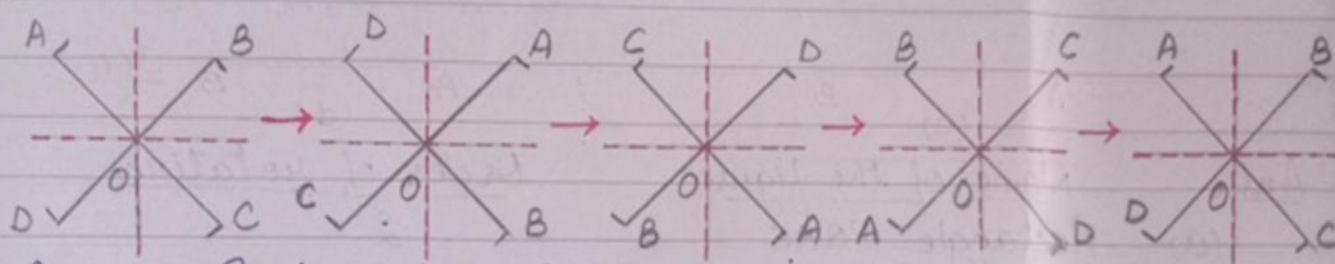
Order of rotation $\rightarrow 3$

(b)



Ans:- Centre of rotation $\rightarrow P$
Direction of rotation $\rightarrow$ clockwise
Angle of rotation $\rightarrow 90^\circ$
Order of rotation $\rightarrow 4$

(c)



Ans:- Centre of rotation $\rightarrow O$
Direction of rotation $\rightarrow$ clockwise
Angle of rotation $\rightarrow 90^\circ$
Order of rotation $\rightarrow 4$

Ques 3 Which of the following figures have rotational symmetry about the marked point (x) give the angle of rotation and order of the rotation of the figures.

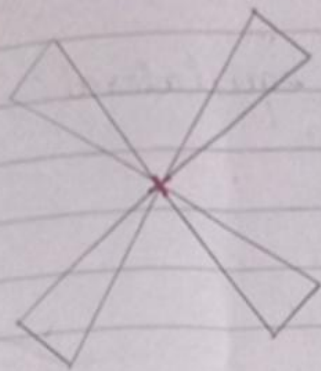
(a)



This figure has rotational symmetry

Angle of rotation $\rightarrow \frac{360^\circ}{2} = 180^\circ$
Order of rotation $\rightarrow 2$

(b)

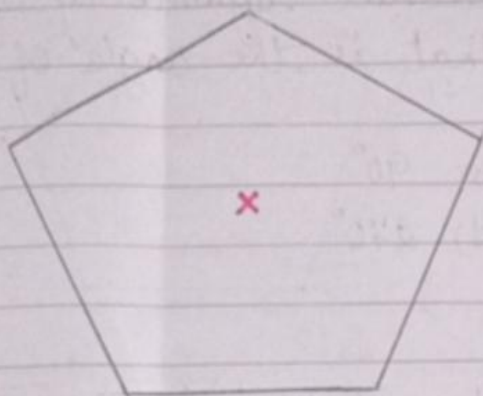


This figure has rotational symmetry.

Order of rotation $\rightarrow 04$

$$\text{Angle of rotation} = \frac{360^\circ}{4} = 90^\circ$$

(c)

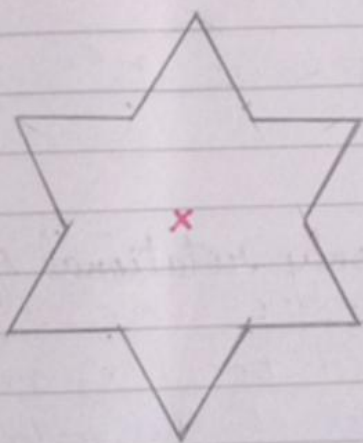


This figure has rotational symmetry.

Order of rotation = 05

$$\text{Angle of rotation} = \frac{360^\circ}{5} = 72^\circ$$

(d)

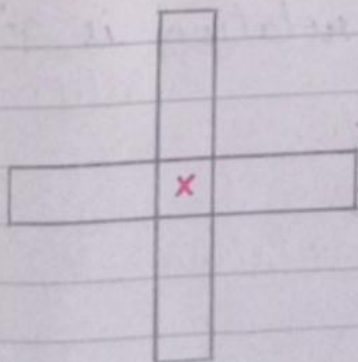


This figure has rotational symmetry.

Order of rotation = 06

$$\text{Angle of rotation} = \frac{360^\circ}{6} = 60^\circ$$

(e)



This figure has rotational symmetry.

Order of rotation = 04

$$\text{Angle of rotation} = \frac{360^\circ}{4} = 90^\circ$$

Ques 4 Multiple choice questions:

(i) The angle of rotation in an equilateral triangle is

(a) 60°

(b) 70°

(c) 90°

(d) 120°

Ans:- (d) 120°

(ii) A square has a rotational symmetry of order 4 about its centre. What is the angle of rotation?

(a) 45°

(b) 90°

(c) 180°

(d) 270°

Ans:- (b) 90°

(iii) What is the order of rotational symmetry of the english alphabet Z?

(a) 0

(b) 1

(c) 2

(d) 3

Ans:- (c) 2

(iv) Which of these letters has only rotational symmetry?

(a) S

(b) E

(c) B

(d) P

Ans:- (a) S

(v) If the smallest angle of rotation is 90° then order of symmetry is?

(a) 1

(b) 3

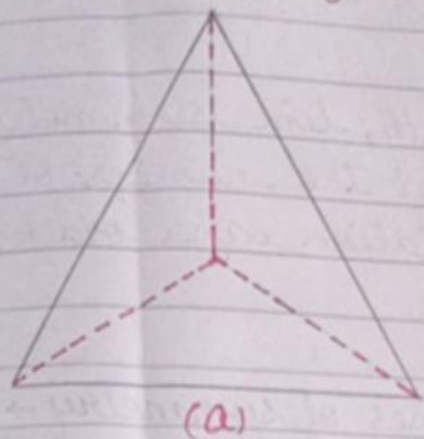
(c) 4

(d) 2

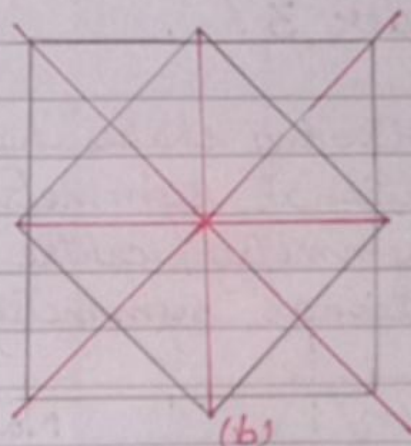
Ans:- (c) 4

EXERCISE 14.3

Ques 1. In the following figures, find the number of lines of symmetry and angle of rotation for rotational symmetry.



(a)



(b)

Ans:- a) No. of lines of symmetry $\rightarrow 03$
Angle of rotation = $\frac{360}{3}$
 $= 120^\circ$

b) No. of lines of symmetry $\rightarrow 04$
Angle of rotation = $\frac{360}{4}$
 $= 90^\circ$

Ques 2 Name any two figures that have both line of symmetry and rotational symmetry.

Ans: Circle and an equilateral triangle are two such figures that have both line of symmetry and rotational symmetry.

Ques 3 If a figure has two or more lines of symmetry should it have a rotational symmetry more than 1?

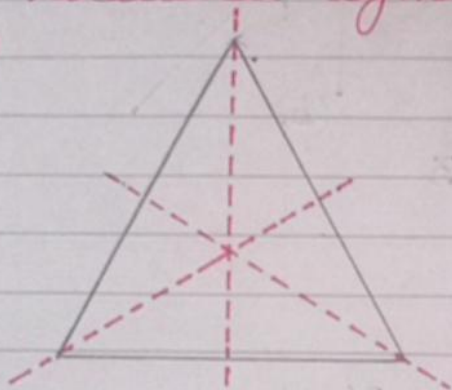
Ans: Yes, if a figure has two or more lines of symmetry, it should have a rotational symmetry more than 1. e.g (i) A square has

4 lines of symmetry and rotational symmetry of order 4.

(ii) An equilateral triangle has 3 lines of symmetry and rotational symmetry of order 3.

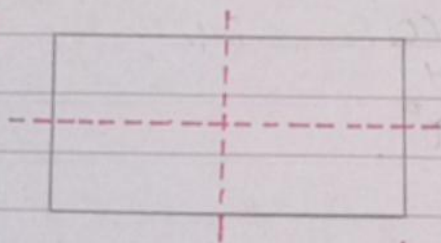
Ques 4 Following shapes have both, line symmetry and rotational symmetry. Find the number of lines of symmetry, centre of rotation and order of rotational symmetry.

(a)



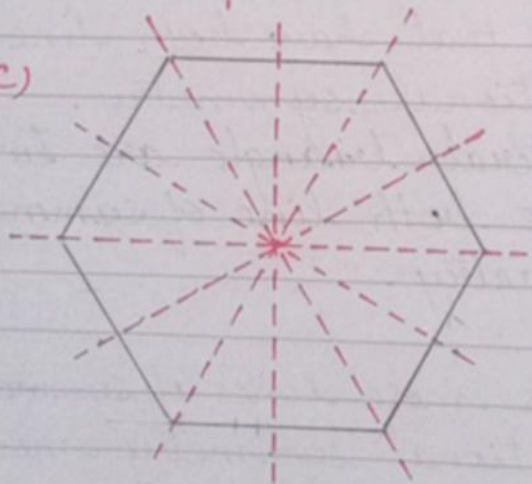
No. of lines of symmetry $\rightarrow 03$
Centre of rotation $\rightarrow$ Centroid
Order of rotational symmetry $\rightarrow 03$

(b)



No. of lines of symmetry $\rightarrow 02$
Centre of rotation $\rightarrow$ Intersection of diagonals
Order of rotational symmetry $\rightarrow 02$

(c)



No. of lines of symmetry $\rightarrow 06$
Centre of rotation $\rightarrow$ Centre of Hexagon
Order of rotational symmetry $\rightarrow 06$

Ques 5 Some of the english alphabets have fascinating symmetrical structures. Which capital letters have just one line of symmetry (Like E)? Which

capital letters have a rotational symmetry of order 2 (Like I)? By attempting to think on such lines, you will be able to fill in the following table.

ENGLISH ALPHABET	LINE SYMMETRY	No. OF LINES OF SYMMETRY	ROTATIONAL SYMMETRY	ORDER OF ROTATIONAL SYMMETRY
Z	No	0	YES	2
S	No	0	YES	2
H	YES	2	YES	2
O	YES	2	YES	4
E	YES	1	YES	1
N	No	0	YES	2
C	YES	1	YES	1

Ques 6 Multiple Choice questions:-

(i) If 60° is the smallest angle of rotation for a given figure what will be the angle of rotation for same figure.

- (a) 150° (b) 180°
(c) 90° (d) 330°

Ans: (b) 180°

(ii) Which of these can not be a measure of an angle of rotation for any figure?

- (a) 120° (b) 180°
(c) 17° (d) 90°

Ans:- (c) 17°

(iii) Which of the following have both line symmetry and rotational symmetry?

- (a) An isosceles triangle (b) A scalene triangle
(c) A square (d) A parallelogram

Ans:- (c) Square

(iv) Which of the alphabet has both multiple line and rotational symmetries?

(a) S

(b) O

(c) H

(d) L

Ans:- (b) O

(v) In the word 'MATHS' which of the following pairs of letters shows rotational symmetry?

(a) M and T

(b) H and S

(c) A and S

(d) T and S

Ans:- (b) H and S