# CHAPTER – 13

# SYMMETRY

## EXERCISE – 13.1

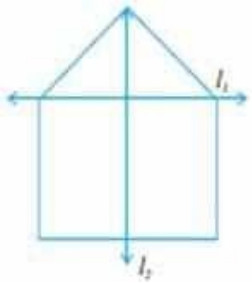
**Q. 1** List any four symmetrical objects from your home or school.

Answer:

Four symmetrical objects that we use in our home or school are as follows:

Paper, Glass, Bucket, CD etc.

**Q. 2** For the given figure, which one is the mirror line, $l_1$ or $l_2$?

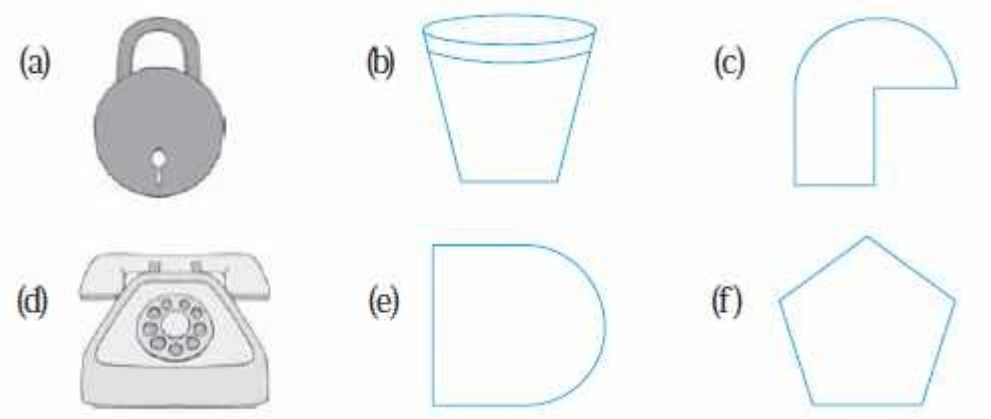



Answer:

In the above given figure line $l_2$ is the mirro line of the figure.

This is because when the figure is folded about the line $l_2$ then the left part will cover the right part completely.

**Q. 3** Identify the shapes given below (Text book). Check whether they are symmetric or not. Draw the line of symmetry as well.




Answer:

(a) The given figure is symmetrical and the lines of symmetry in the given figure are as follows:

(b) The given figure is symmetrical and the lines of symmetry in the given figure are as follows:

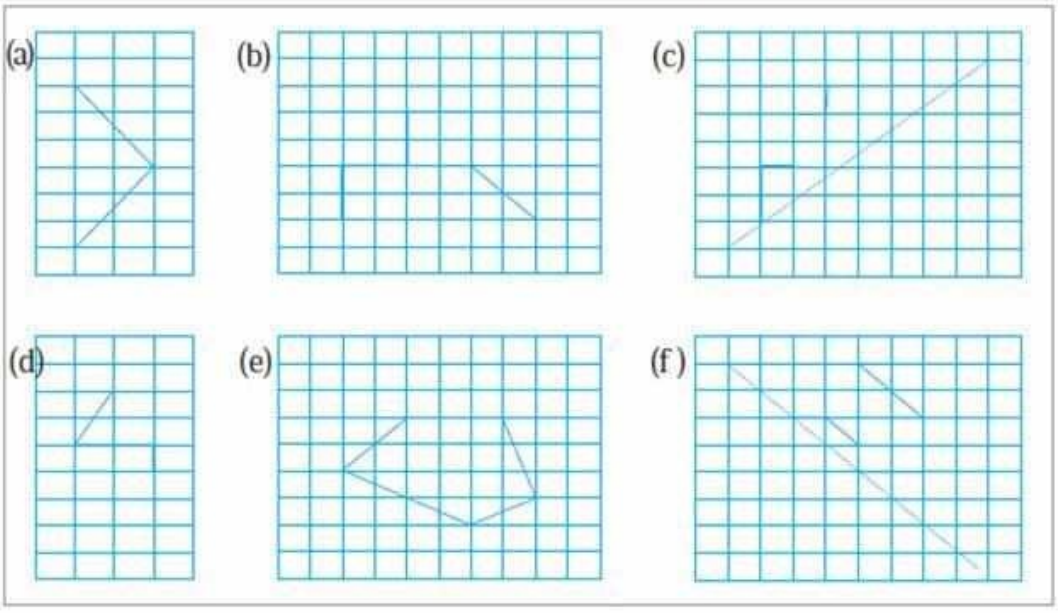
(c) The given figure is not symmetrical. Hence there are no lines of symmetry in it.

(d) The given figure is symmetrical and the lines of symmetry in the given figure are as follows:

(e) The given figure is symmetrical and the lines of symmetry in the given figure are as follows:

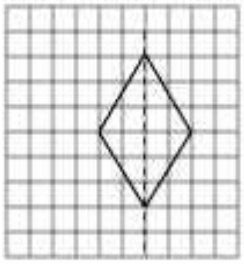
(f) The given figure is symmetrical and the lines of symmetry in the given figure are as follows:

**Q. 4** Copy the following on a squared paper. A square paper is what you would have used in your arithmetic notebook in earlier classes. Then complete them such that the dotted line is the line of symmetry.

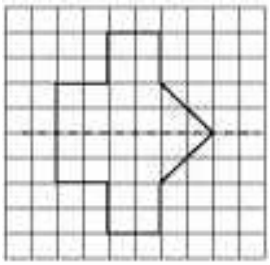


Answer:

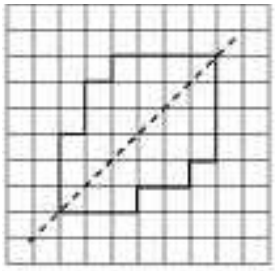
(a) Completion of above given figure is as follow:



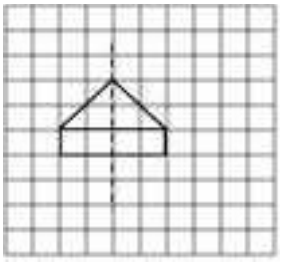
(b) Completion of above given figure is as follow:



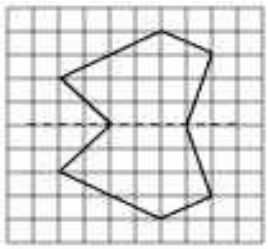
(c) Completion of above given figure is as follow:



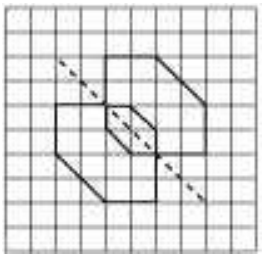
(d) Completion of above given figure is as follow:



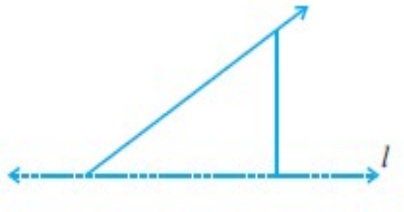
(e) Completion of above given figure is as follow:



(f) Completion of above given figure is as follow:

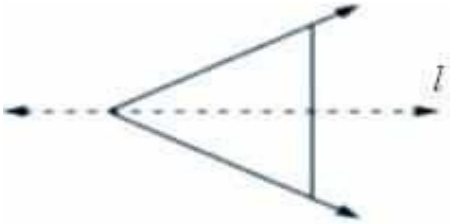


**Q. 5** In the figure, *l* is the line of symmetry. Complete the diagram to make it symmetric.

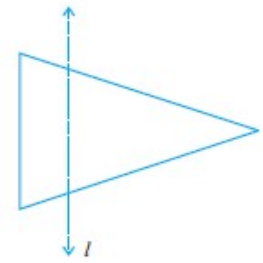



Answer:

The above given diagram can be completed as follows:

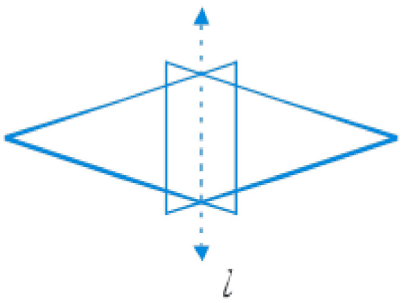



**Q. 6** In the figure, *l* is the line of symmetry. Draw the image of the triangle and complete the diagram so that it becomes symmetric.




Answer:

To make the above diagram symmetric, we can complete it as follows:



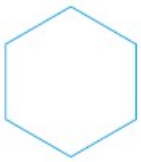
## EXERCISE – 13.2

**Q. 1**

Find the number of lines of symmetry for each of the following shapes:

(a)  (b) 

(c)  (d) 

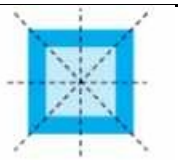
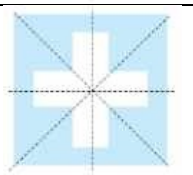
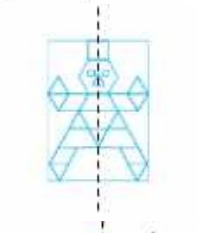
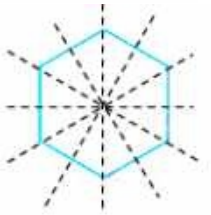
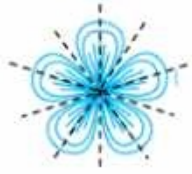
(e)  (f) 

(g)  (h) 

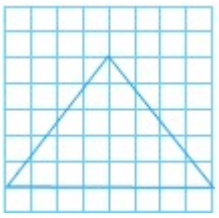
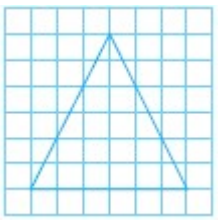
(i) 

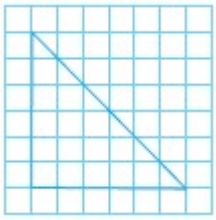
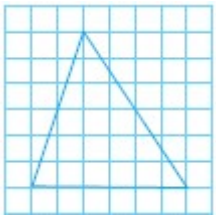
Answer:

The following figures have the following lines of symmetry:

| | | |
|---|---|---|
| (a) |  | The given figure has **4** lines of symmetry. |
| (b) |  | The given figure has **4** lines of symmetry. |
| (c) |  | The given figure has **4** lines of symmetry. |
| (d) |  | The given figure has only **1** lines of symmetry. |
| (e) |  | The given figure has **6** lines of symmetry. |
| (f) |  | The given figure has **6** lines of symmetry. |
| (g) |  | The given figure has **6** lines of symmetry. |
| (h) |  | The given figure is asymmetrical. Thus, no line of symmetry. |
| (i) |  | The given figure is asymmetrical. Thus, no line of symmetry. |
| (j) |  | The given figure has **5** lines of symmetry. |

**Q. 2** Copy the triangle in each of the following figures on squared paper. In each case, draw the line(s) of symmetry, if any and identify the type of triangle. (Some of you may like to trace the figures and try paper-folding first!)

(a)  (b) 

(c)  (d) 

Answer:

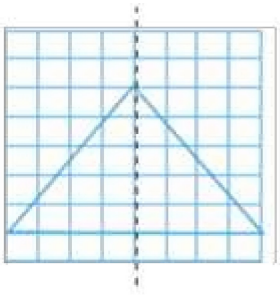
(a) At first,

We have to copy the figure,

And, then

We have to draw the line of symmetry if present.

Thus,



Hence,

We can observe that,

There is only one line of symmetry

Therefore,

It is an isosceles triangle.

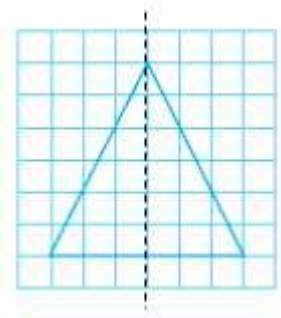
(b) At first,

We have to copy the figure,

And, then

We have to draw the line of symmetry if present.

Thus,



Hence,

We can observe that,

There is only one line of symmetry

Therefore,

It is an isosceles triangle.

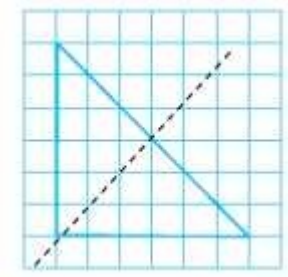
(c) At first,

We have to copy the figure,

And, then

We have to draw the line of symmetry if present.

Thus,



Hence,

We can observe that,

There is only one line of symmetry

And,

An angle is right angled

Therefore,

It is a right-angled isosceles triangle.

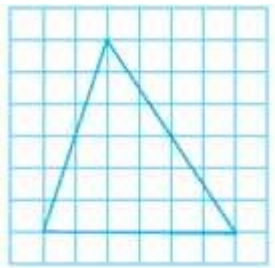
(d) At first,

We have to copy the figure,

And, then

We have to draw the line of symmetry if present.

Thus,



Now,

We can observe that there is no line of symmetry possible in the figure.

Hence,

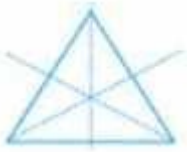
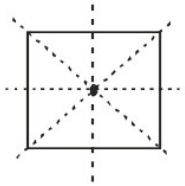
The given triangle is a scalene triangle.

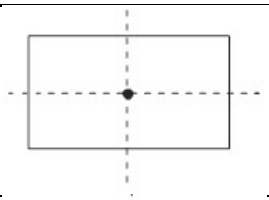
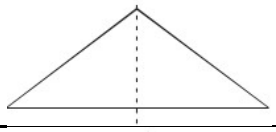
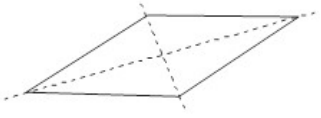
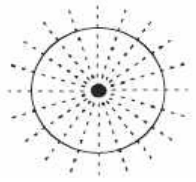
**Q. 3** Complete the following table:

| **Shape** | **Rough figure** | **Number of lines of symmetry** |
|---|---|---|
| **Equilateral Triangle** |  | |
| Square | | |
| Rectangle | | |
| **Isosceles Triangle** | | |
| Rhombus | | |
| Circle | | |

Answer:

We can fill the given table as follows:

| **Shape** | **Rough figure** | **Number of lines of symmetry** |
|---|---|---|
| **Equilateral Triangle** |  | 3 |
| Square |  | 4 |

| | | |
|---|---|---|
| Rectangle |  | 2 |
| **Isosceles Triangle** |  | 1 |
| Rhombus |  | 2 |
| Circle |  | Infinite |

**Q. 4** Can you draw a triangle which has:

(a) Exactly one line of symmetry?
(b) Exactly two lines of symmetry?
(c) Exactly three lines of symmetry?
(d) No lines of symmetry?

Answer:

(a) Here,

We have to draw a triangle which has only one line of symmetry.

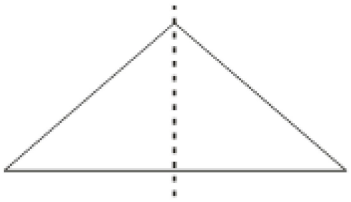
Hence,

For the given case,

We will draw an isosceles triangle.

Therefore,

The triangle can be drawn as:



(b) Here,

We have to draw a triangle which has only two lines of symmetry.

But,

We know that,

There exists no triangle with only two symmetry lines.

Hence,

For the given case,

No such triangle is possible.

(c) Here,

We have to draw a triangle which has only three lines of symmetry.

Hence,

For the given case,

We will draw an equilateral triangle.

Therefore,

The triangle can be drawn as:

**Q. 5** On a squared paper, sketch the following:

(a) A triangle with a horizontal line of symmetry but no vertical line of symmetry.

(b) A quadrilateral with both horizontal and vertical lines of symmetry.
(c) A quadrilateral with a horizontal line of symmetry but no vertical line of symmetry.
(d) A hexagon with exactly two lines of symmetry.
(e) A hexagon with six lines of symmetry.

Answer:

**(a)** Here,

We have to draw a triangle which has only one line of symmetry that is horizontal line of symmetry

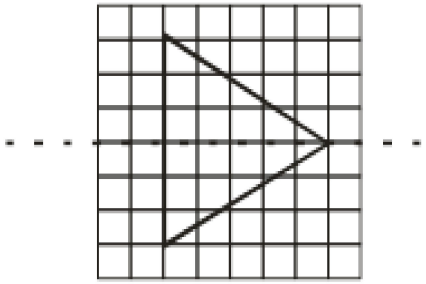
And,

No vertical line of symmetry.

Hence,

For the given case,

The triangle can be drawn as:



**(b)** Here,

We have to draw a quadrilateral which has both

The horizontal line of symmetry

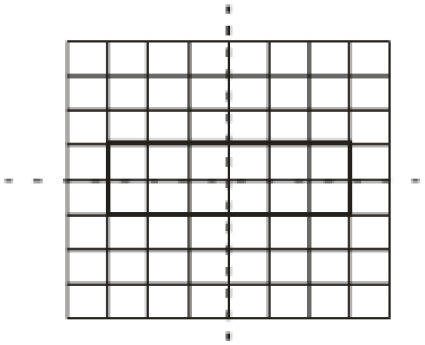
And,

The vertical line of symmetry

Hence,

For the given case,

The quadrilateral can be drawn as:



**(c)** Here,

We have to draw a quadrilateral which has only one line of symmetry that is:

The horizontal line of symmetry

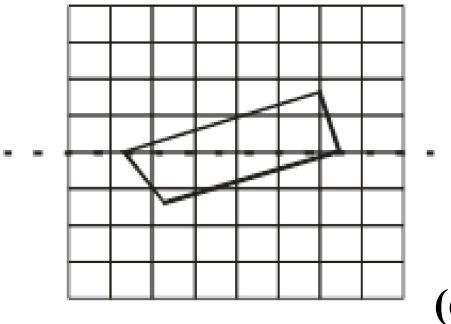
And,

No vertical line of symmetry

Hence,

For the given case,

The quadrilateral can be drawn as:



**(d)** Here,

We have to draw a hexagon which has exactly two lines of symmetry that is:

The horizontal line of symmetry

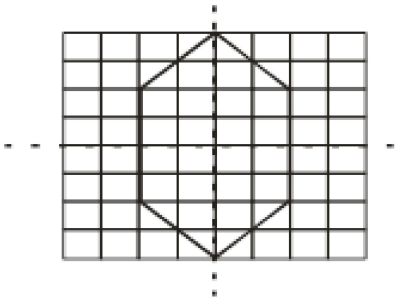
And,

The vertical line of symmetry

Hence,

For the given case,

The hexagon can be drawn as:



**(e)** Here,

We have to draw a hexagon which has in all six lines of symmetry

Now,

In order to draw such hexagon

At first,

We will draw those six lines of symmetry

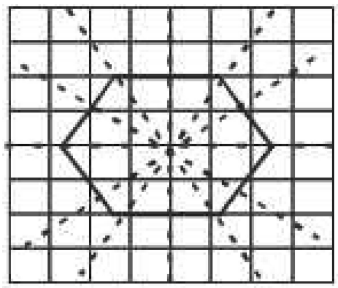
And, then

We will complete the hexagon

Hence,

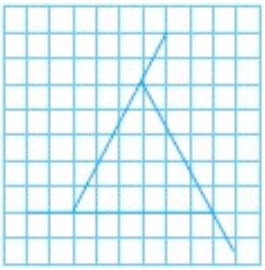
For the given case,

The hexagon can be drawn as:

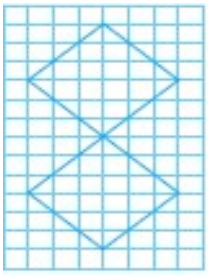


**Q. 6** Trace each figure and draw the lines of symmetry, if any:

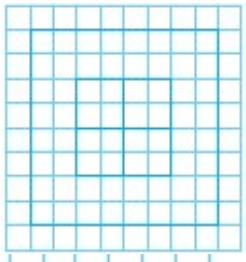
(a)



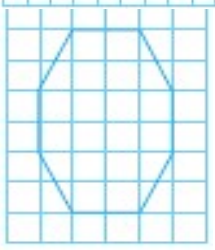
(b)

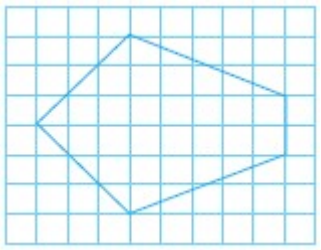


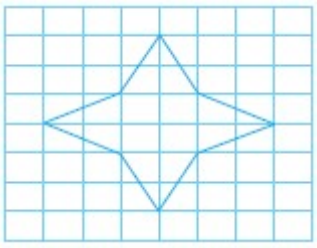
(c)



(d)



(e) 

(f) 

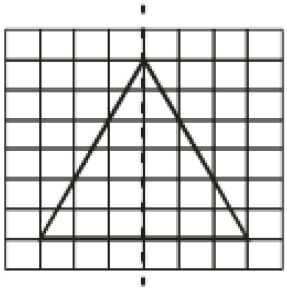
Answer:

(a) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure is an isosceles triangle

Hence,

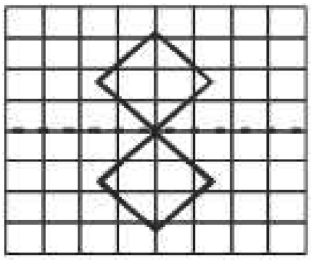
It will have only one line of symmetry.

(b) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure has two squares having a common vertex.

Hence,

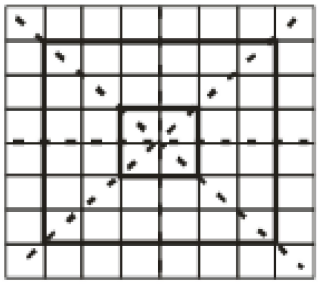
The figure will have two lines of symmetry.

(c) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure has two squares with a common centre

Hence,

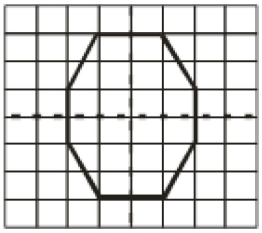
The figure will have four lines of symmetry

(d) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure is an octagonal

Hence,

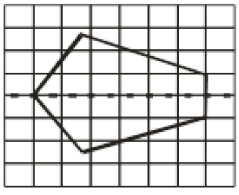
It will have two lines of symmetry.

(e) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure is not any specific figure

Hence,

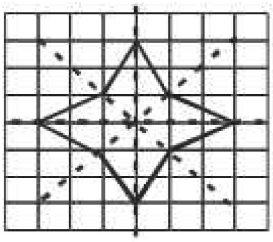
It will have only one line of symmetry.

(f) Here,

At first,

We have to trace the figure

Thus,



Now,

We can observe that

The given figure is a four cornered figure

Hence,

It will have four lines of symmetry.

**Q. 7**

Consider the letters of English alphabets, A to Z. List among them the letters which have:

(a) Vertical lines of symmetry (like A)
(b) horizontal lines of symmetry (like B)
(c) no lines of symmetry (like Q)

Answer:

(a) The letters that have vertical line of symmetry are as follows:

A, H, I, M, O, T, U, V, W, X, Y

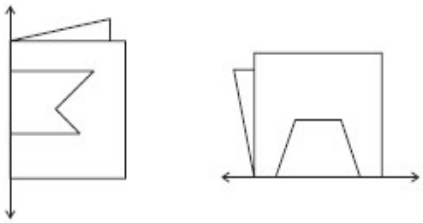
(b) The letters that have horizontal line of symmetry are as follows:

B, C, D, E, H, I, K, O, X

(c) The letters that have no line of symmetry are as follows:

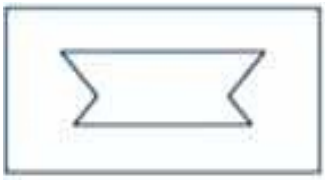
F, G, J, L, N, P, Q, R, S, Z

**Q. 8** Given here are figures of a few folded sheets and designs drawn about the fold. In each case, draw a rough diagram of the complete figure that would be seen when the design is cut off.



Answer:

The complete figure will be as follows:



## EXERCISE – 13.3

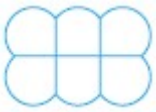
**Q. 1** Find the number of lines of symmetry in each of the following shapes:

How will you check your answer?

(a) 

(b) 

(c) 

(d) 

(e) 

(f) 

Answer:

(a) From the above given figure, it is clearly observed that,

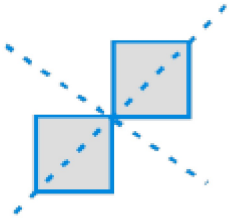
There are 4 lines of symmetry in the given figure and it can be drawn as follows:

(b) From the above given figure, it is clearly observed that,

There is only 1 line of symmetry in the given figure and it can be drawn as follows:

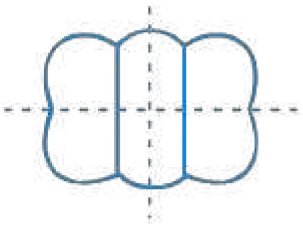
(c) From the above given figure, it is clearly observed that,

There are 2 lines of symmetry in the given figure and it can be drawn as follows:



(d) From the above given figure, it is clearly observed that,

There are 2 lines of symmetry in the given figure and it can be drawn as follows:

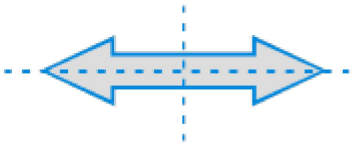


(e) From the above given figure, it is clearly observed that,

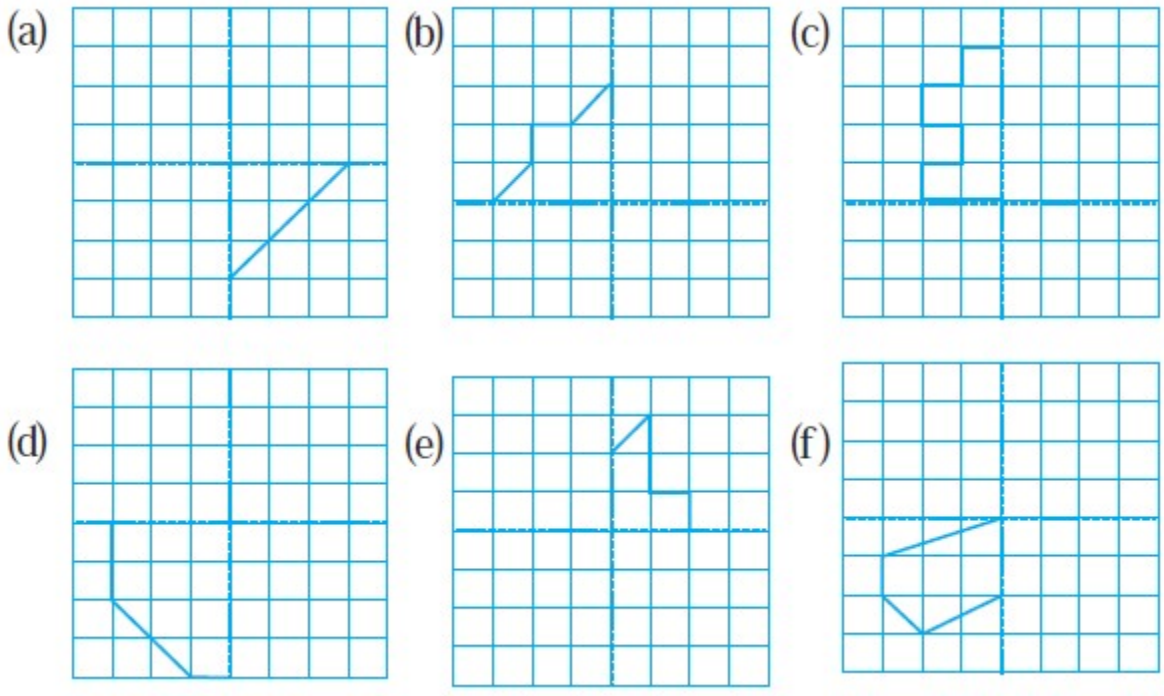
There is only 1 line of symmetry in the given figure and it can be drawn as follows:

(f) From the above given figure, it is clearly observed that,

There are 2 lines of symmetry in the given figure and it can be drawn as follows:



**Q. 2** Copy the following drawing on squared paper. Complete each one of them such that the resulting figure has two dotted lines as two lines of symmetry:




How did you go about completing the picture?

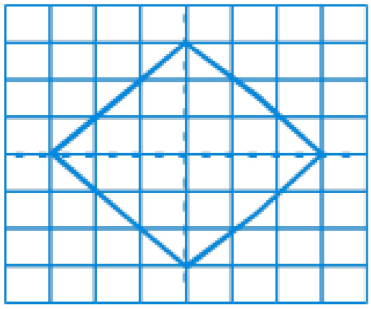
Answer:

(a) The above given figure can be completed by drawing the same parts as shown in the given figure

We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:

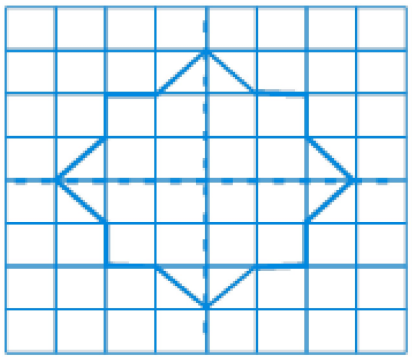


(b) The above given figure can be completed by drawing the same parts as shown in the given figure

We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:

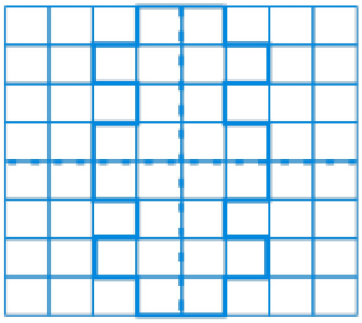


(c) The above given figure can be completed by drawing the same parts as shown in the given figure

We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:

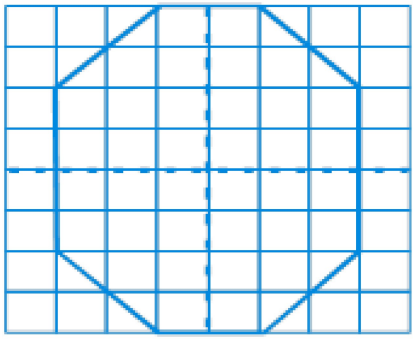


(d) The above given figure can be completed by drawing the same parts as shown in the given figure

We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:

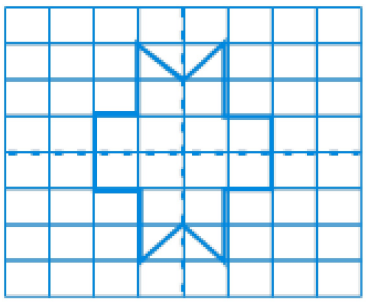


(e) The above given figure can be completed by drawing the same parts as shown in the given figure

We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:

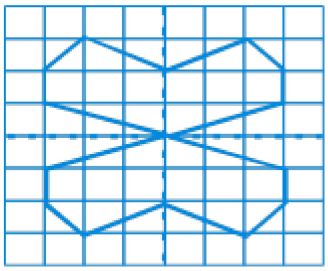


(f) The above given figure can be completed by drawing the same parts as shown in the given figure

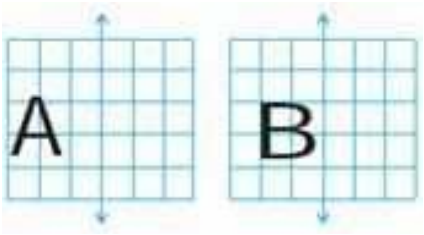
We can draw this by drawing horizontal and vertical line of symmetry

Therefore,

The above given figure can be completed as follows:



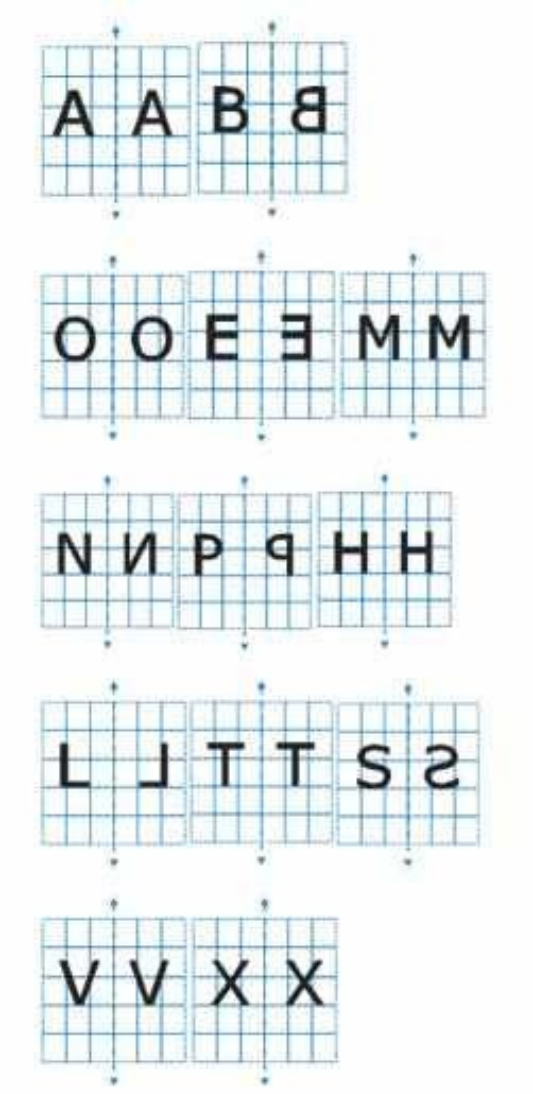
**Q. 3** In each figure alongside, a letter of the alphabet is shown along with a vertical line. Take the mirror image of the letter in the given line. Find which letters look the same after reflection (i.e. which letters look the same in the image) and which do not. Can you guess why?




Try For OEMNPHLTSVX

Answer:

Mirror image for above given figures is as follows:




From the above drawn figures, we have

Figures having vertical line of symmetry will have same mirror images and these are:

O, M, H, T, V, X

Thus, these letters will look the same.