CBSE NCERT Solutions for Class 6 Mathematics Chapter 13

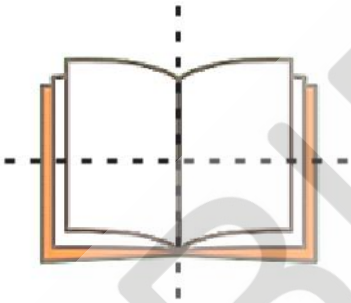
Back of Chapter Questions

Exercise: 13.1

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

Solution:

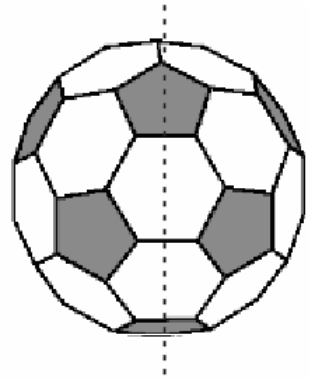
Notebook



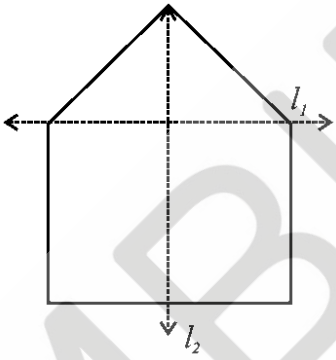
Pencil

Round plate

Football.



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



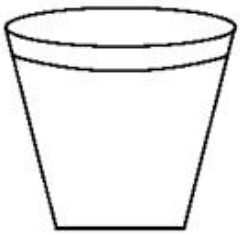
Solution:

l_2 is the mirror line because it divides the entire figure into two halves such that they are mirror images of each other.

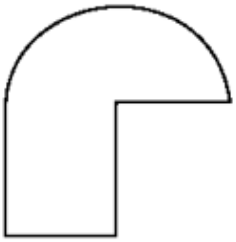
3. Identify the shapes given below. Check whether they are symmetric or not. Draw the line of symmetry as well.

(A)

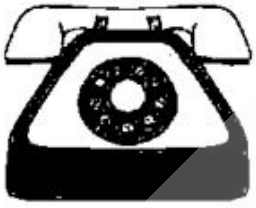
(B)



(C)

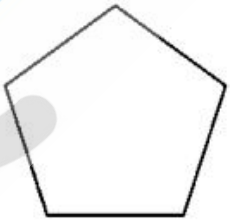


(D)



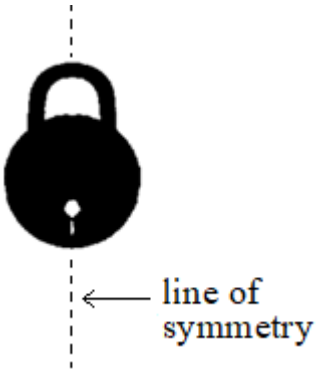
(E)

(F)

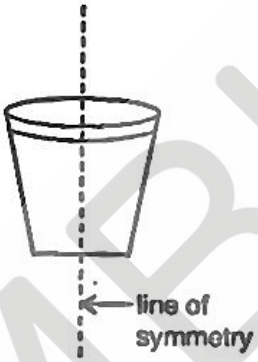


Solution:

(A) The given figure is symmetrical, and the line of symmetry is as shown below.

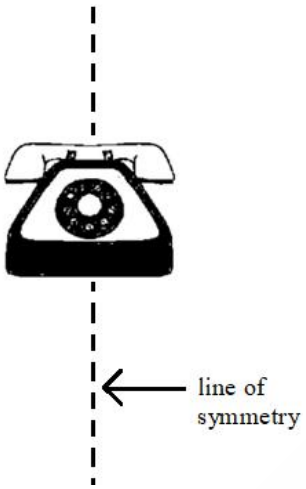


(B) The given figure is symmetrical, and the line of symmetry is as shown below.

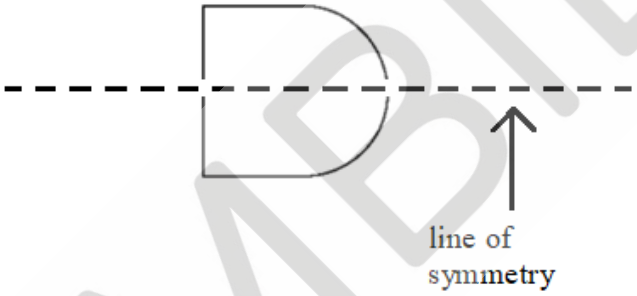


(C) The given figure is non-symmetrical.

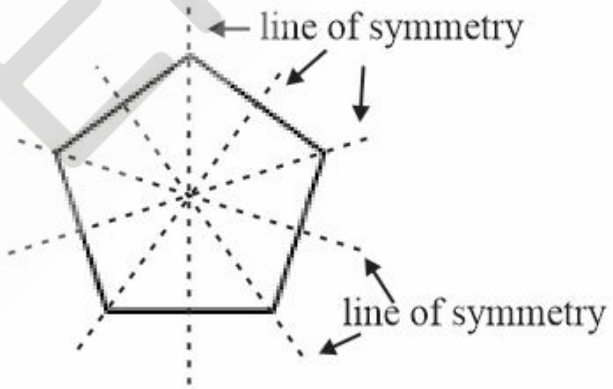
(D) The given figure is symmetrical and the line of symmetry is as shown below.line of symmetry



(E) The given figure is symmetrical, and the line of symmetry is as shown below.

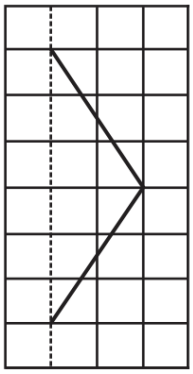


(F) The given figure is symmetrical, and the line of symmetry is as shown below.

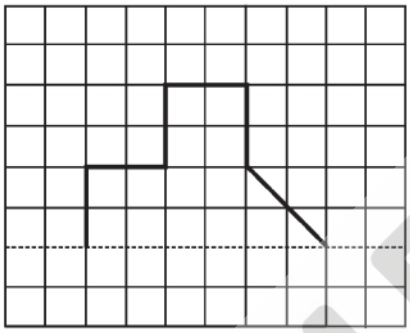


4. Copy the following on a squared paper. A square paper is what you would have used in your arithmetic notebook in earlier classes. Then complete them such that the dotted line is the line of symmetry.

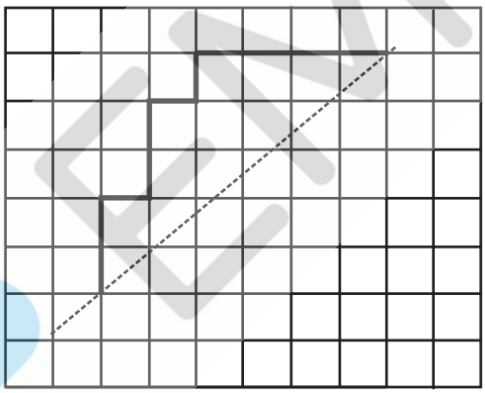
(A)



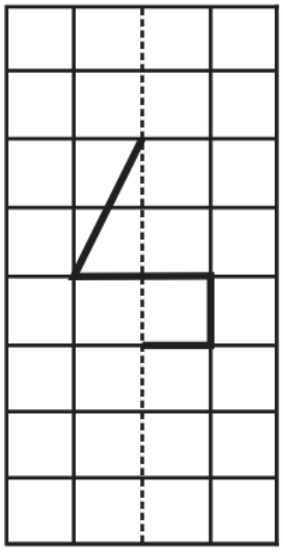
(B)



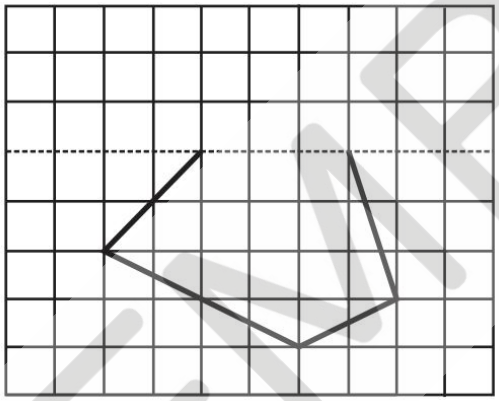
(C)



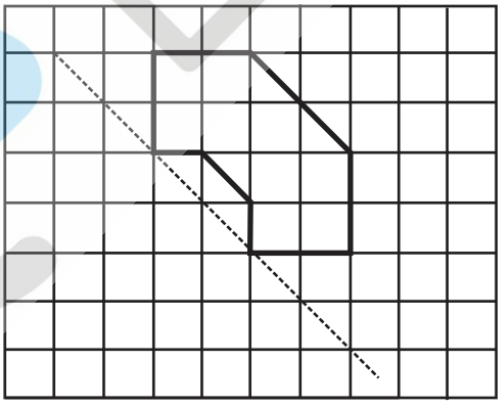
(D)



(E)



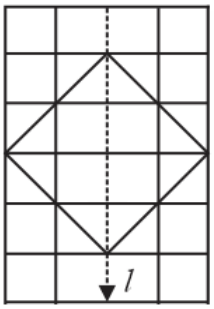
(F)



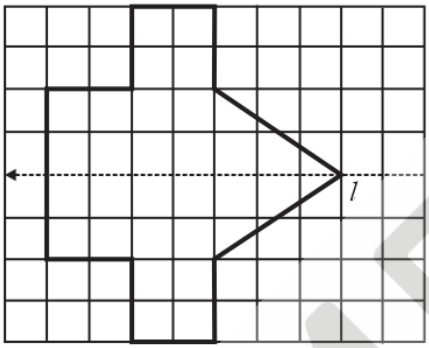
Solution:

The following are the completed figures such that they are symmetric across the dotted line.

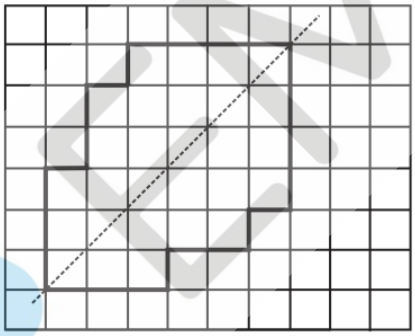
(A)



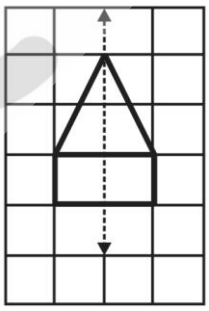
(B)



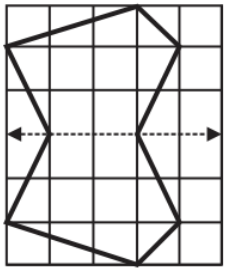
(C)



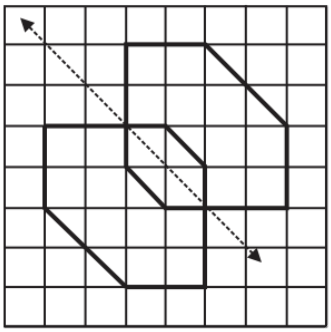
(D)



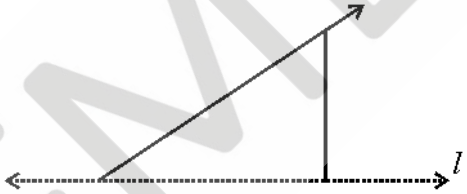
(E)



(F)

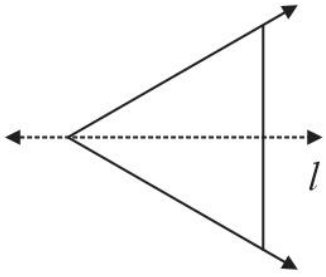


5. In the figure, l is the line of symmetry. Complete the diagram to make it symmetric.

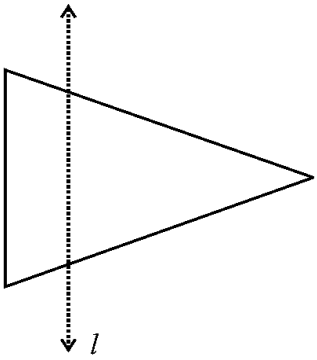


Solution:

The following is the completed figure such that it is symmetric with respect to the line l.

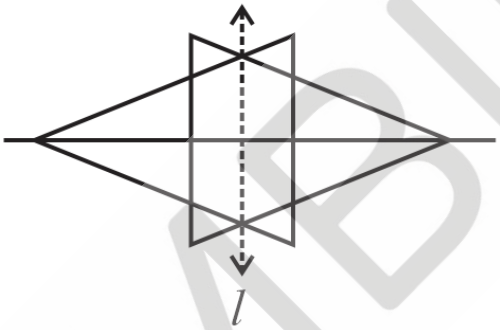


6. In the figure, l is the line of symmetry. Draw the image of the triangle and complete the diagram so that it becomes symmetric.



Solution:

In order to complete this figure, let us consider a horizontal line such that vertices of the two triangles lie on it as shown below:



Now, the figure is symmetrical with respect to line l

Exercise: 13.2

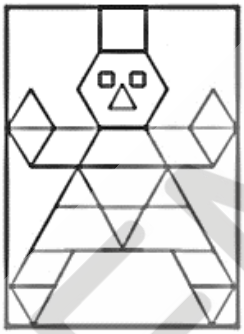
1. Find the number of lines of symmetry for each of the following shapes:

(A)

(B)

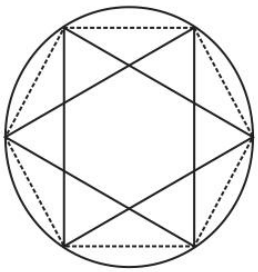
(C)

(D)



(E)

(F)



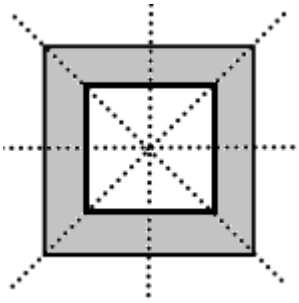
(G)

(H)

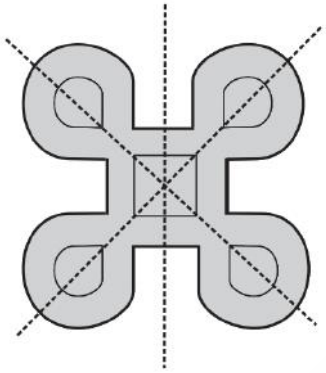
(I)

Solution:

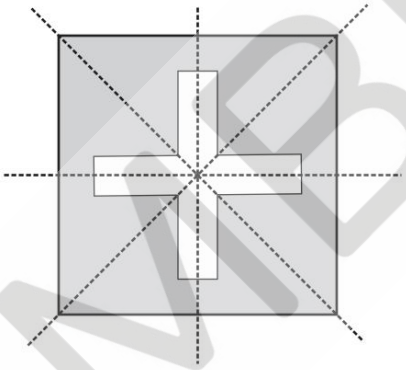
(A) The given figure has 4 lines of symmetry



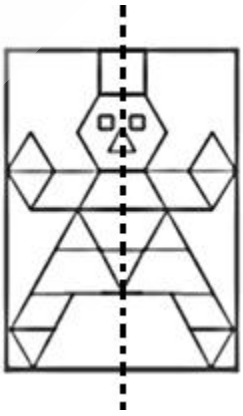
(B) The given figure has 4 lines of symmetry,



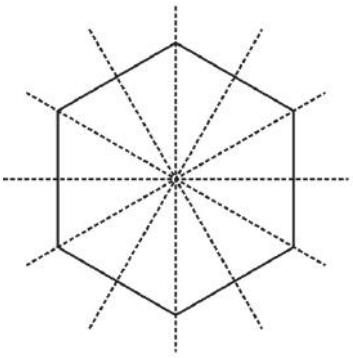
(A) The given figure has 4 lines of symmetry.



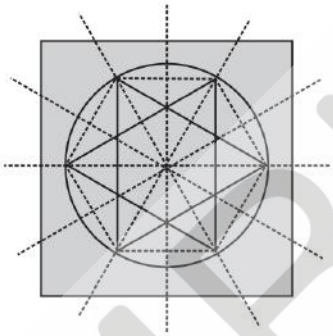
(B) The given figure has only one line of symmetry.



(C) The given figure has 6 lines of symmetry.



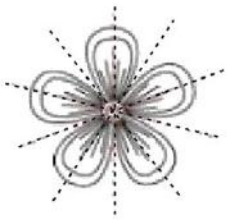
(D) The given figure has 6 lines of symmetry.



(G) The given figure has no line of symmetry.

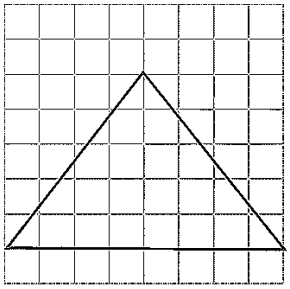
(H) The given figure has no line of symmetry.

(I) The given figure has 5 lines of symmetry.

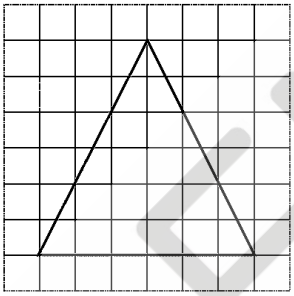


2. Copy the triangle in each of the following figures on squared paper. In each case, draw the line(s) of symmetry, if any and identify the type of triangle. (Some of you may like to trace the figures and try paper-folding first!)

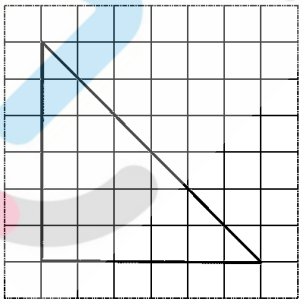
(A)



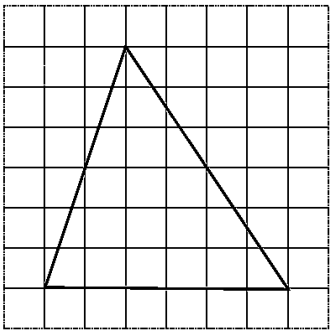
(B)



(C)

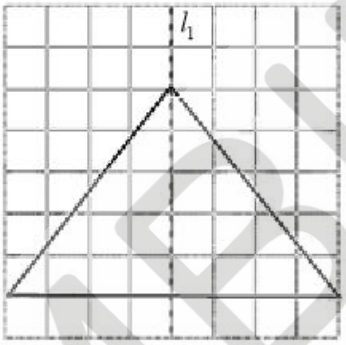


(D)

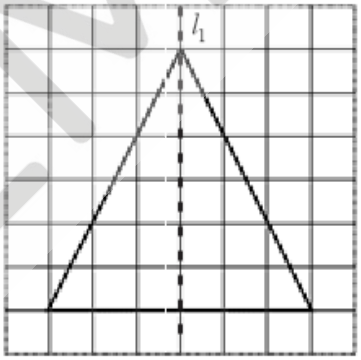


Solution:

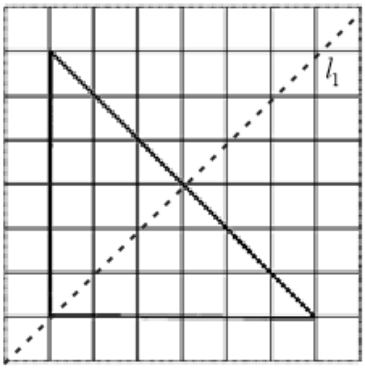
(A) l_1 is the line of symmetry. The given triangle is an isosceles triangle.



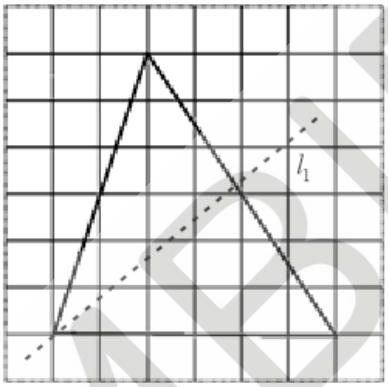
(B) l_1 is the line of symmetry. The given triangle is an isosceles triangle.



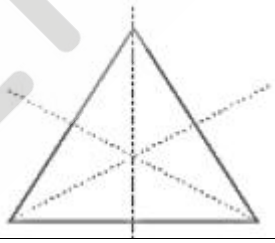
(C) l_1 is the line of symmetry. The given triangle is a right-angled triangle.



(D) No line of symmetry. The given triangle is a scalene triangle.

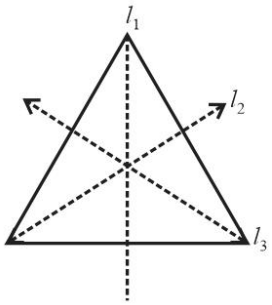
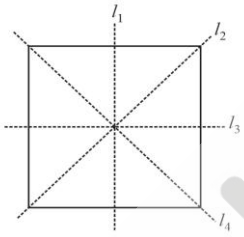
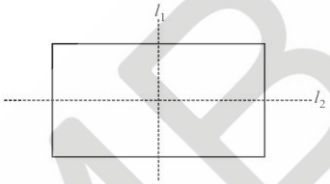
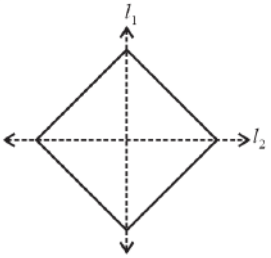


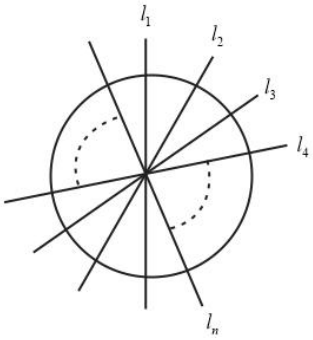
3. Complete the following table.

Shape	Rough figure	Number of lines of symmetry
Equilateral triangle		
Square		
Rectangle		
Isosceles triangle		
Rhombus		
Circle		

Solution:

Shape	Rough figure	No. of lines of symmetry

Equilateral triangle		3
Square		4
Rectangle		2
Isosceles triangle		1
hombus		2

Circle		Infinite

4. Can you draw a triangle which has

(A) exactly one line of symmetry?

(B) exactly two lines of symmetry?

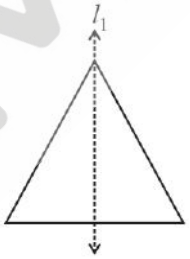
(C) exactly three lines of symmetry?

(D) no lines of symmetry?

Sketch a rough figure in each case.

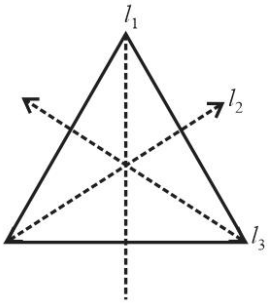
Solution:

(A) Yes. An isosceles triangle has only one line of symmetry, because two sides of it are equal and hence, the line of symmetry can be drawn only through the mid-point of third side and opposite vertex.

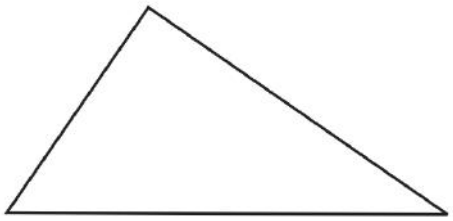


(B) No. A triangle with two lines of symmetry cannot exist.

(C) Yes. An equilateral triangle has three lines of symmetry, one with respect to each of its sides and opposite vertex.



(D) Yes. Scalene triangle has no line of symmetry since all of its sides are unequal.



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.

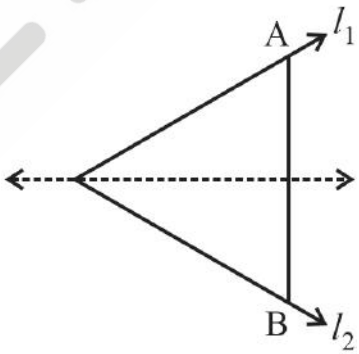
(D) A hexagon with exactly two lines of symmetry.

(E) A hexagon with six lines of symmetry.

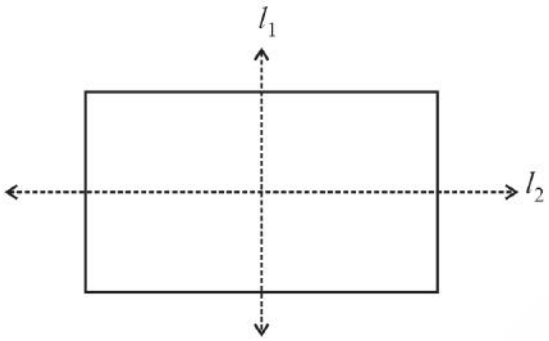
(Hint: It will be helpful if you first draw the lines of symmetry and then complete the figures.)

Solution:

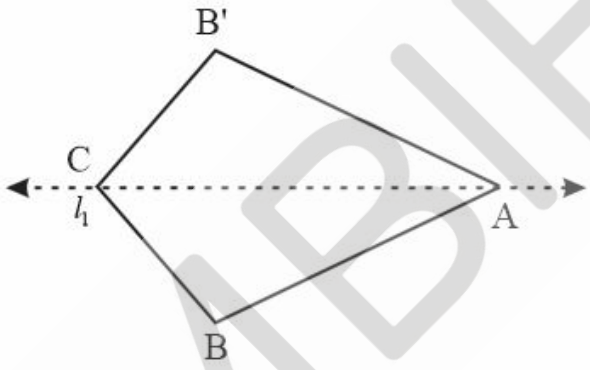
(A) The following figure is symmetric only with respect to the horizontal line l_1. It is an isosceles triangle with base BB'.



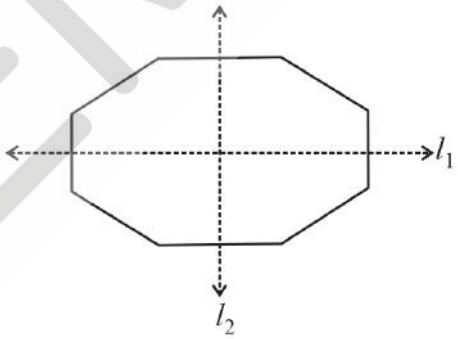
(B) A rectangle is a quadrilateral with two lines of symmetry. The following figure is symmetric with respect to lines l_1 and l_2.



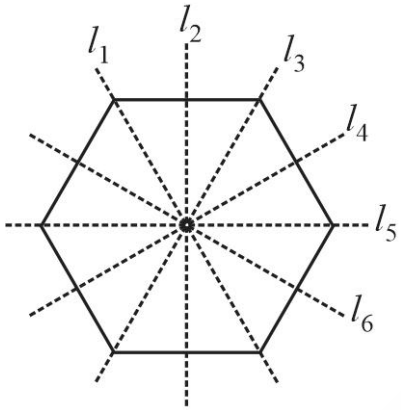
(C) The following quadrilateral is symmetric only with respect to the horizontal line l_1



(D) The hexagon shown below has exactly two lines of symmetry: l_1 and l_2.

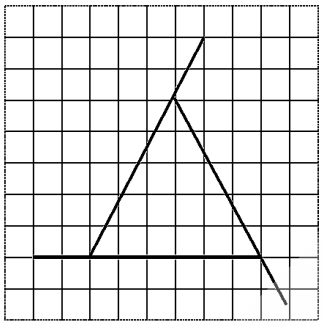


(E) A hexagon with all the six sides equal has six lines of symmetry.

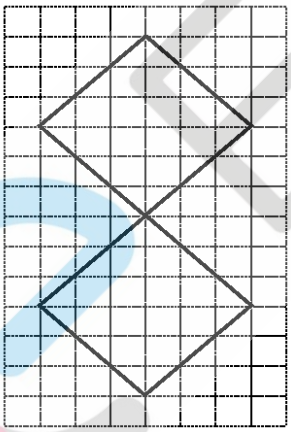


6. Trace each figure and draw the lines of symmetry, if any:

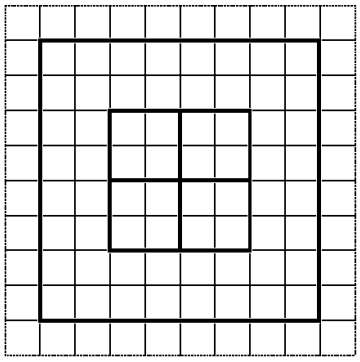
(A)



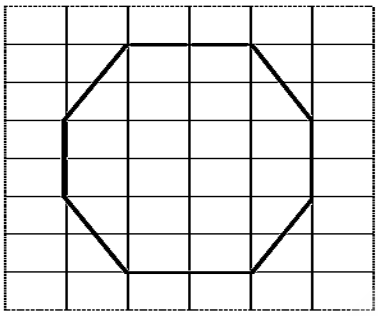
(B)



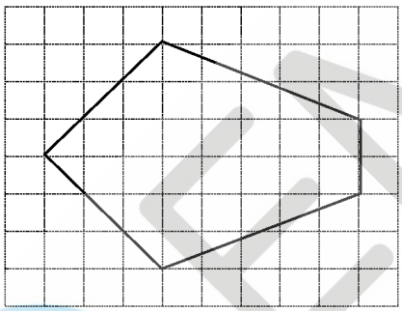
(C)



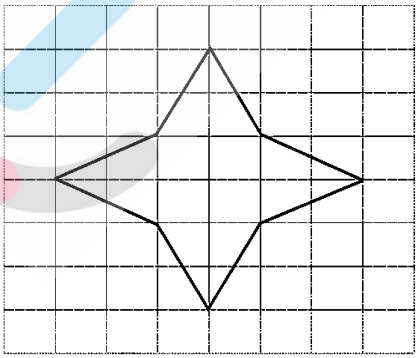
(D)



(E)

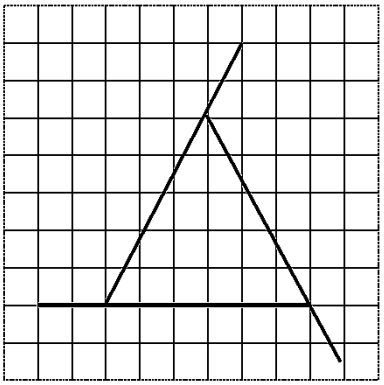


(F)

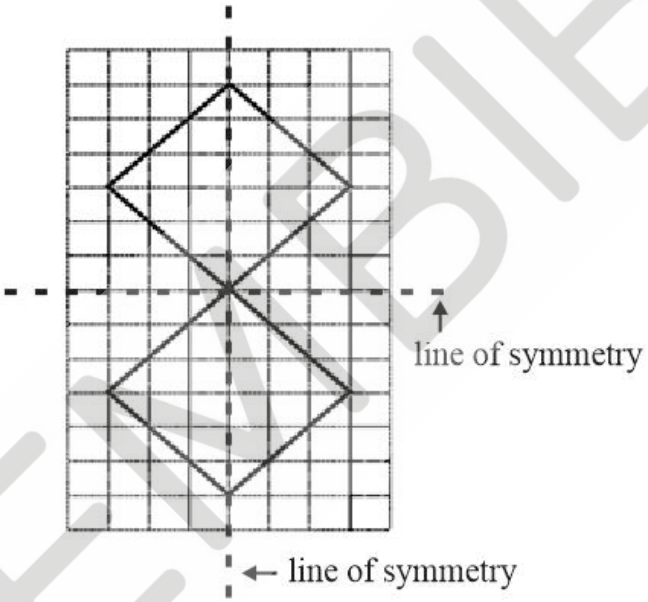


Solution:

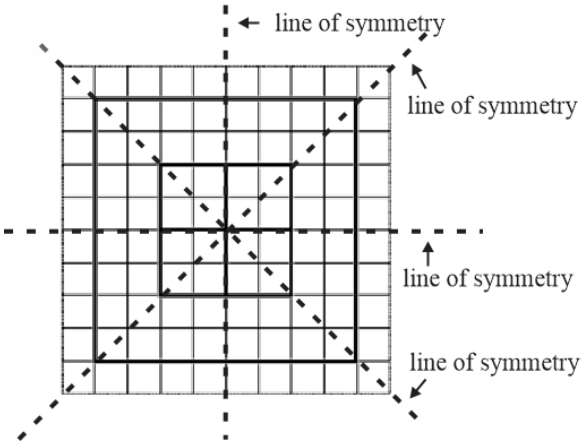
(A) The given figure has no line of symmetry.



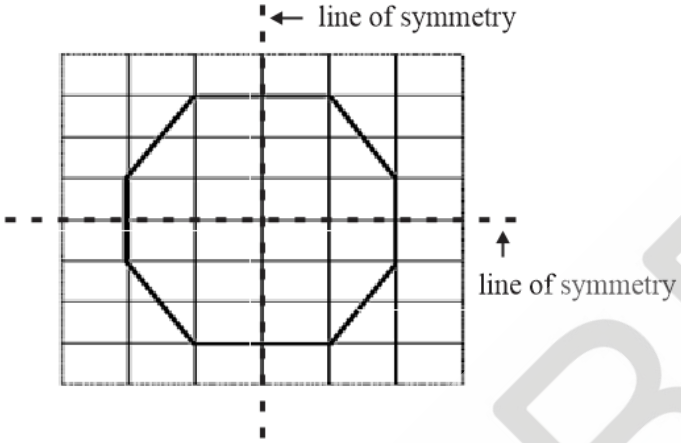
(B) The given figure has two lines of symmetry. The lines of symmetry are shown below.



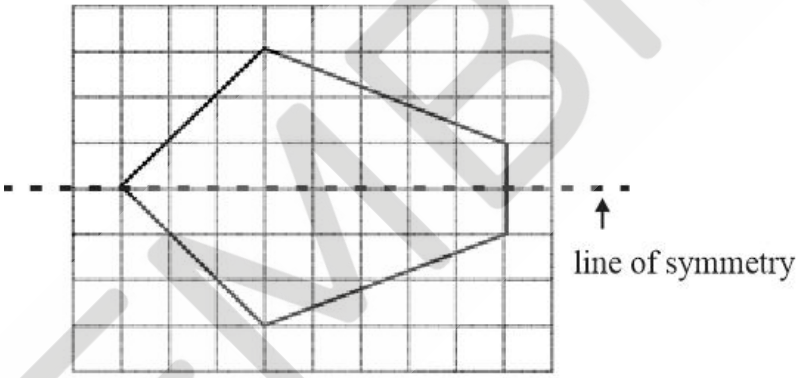
(C) The given figure has 4 lines of symmetry. The lines of symmetry are as shown below:



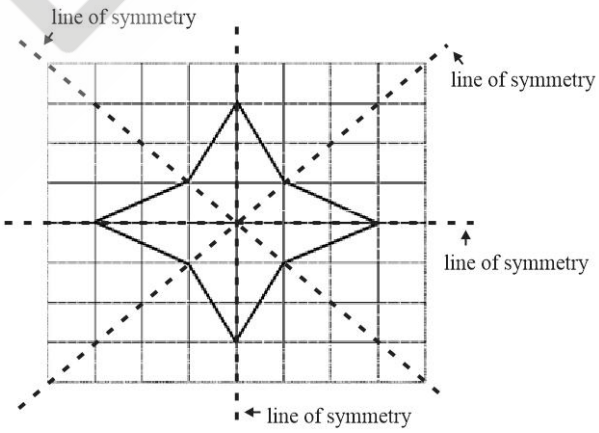
(D) The given figure has two lines of symmetry. The lines of symmetry are as shown below:



(E) The given figure has only one line of symmetry. The line of symmetry is as shown below:



(F) The given figure has four lines of symmetry. The lines of symmetry are as shown below:

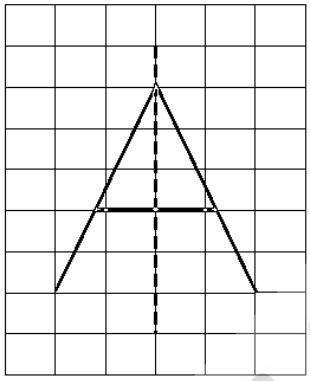


7. Consider the letters of English alphabets, A to Z. List among them the letters which have

(A) vertical lines of symmetry (like A)

(B) horizontal lines of symmetry (like B)

(C) no lines of symmetry (like Q)



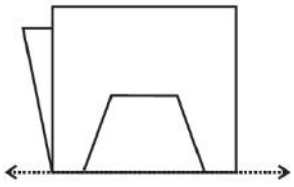
Solution:

The following alphabets have vertical lines of symmetry: A, H, I, M, O, T, U, V, W, X, Y

The following alphabets have horizontal lines of symmetry: B, C, D, E, H, I, K, O, X

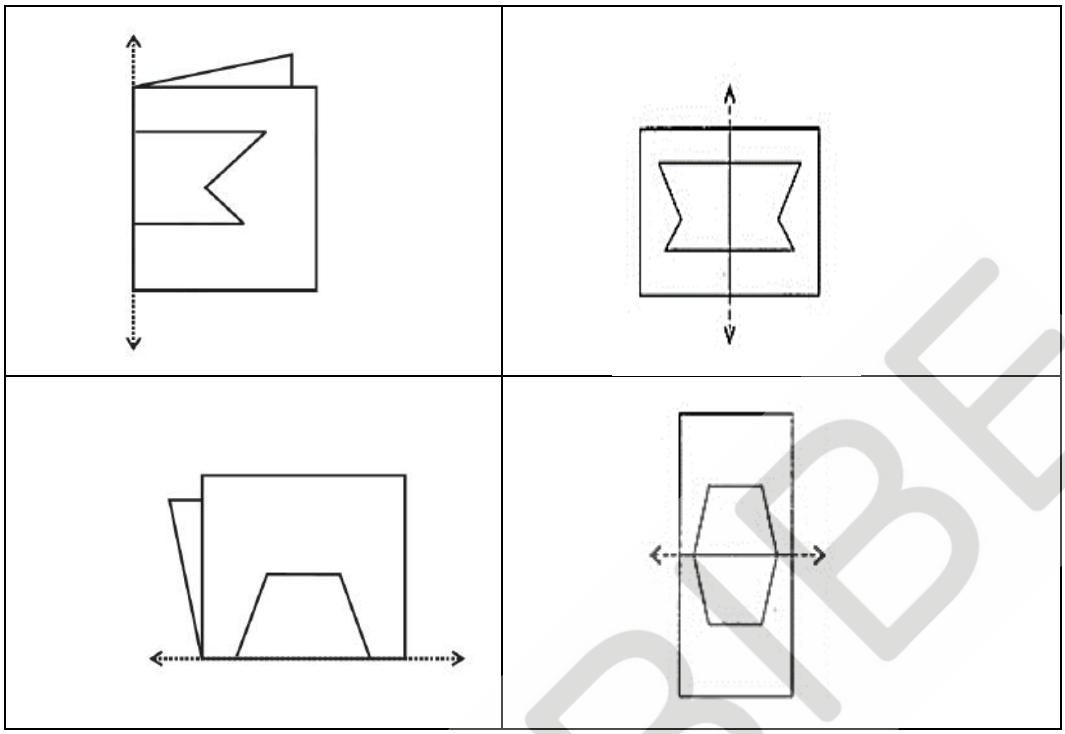
The following alphabets have no lines of symmetry: F, G, J, L, N, P, Q, R, S, Z

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.



Solution:

The initial folded sheets	**Complete figure seen when when design is cut off**

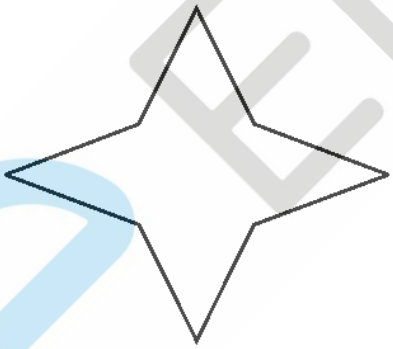


Exercise: 13.3

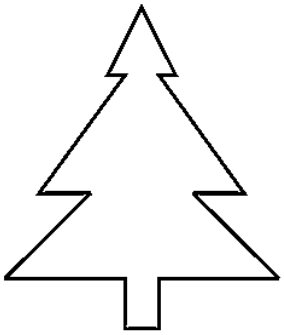
1. Find the number of lines of symmetry in each of the following shapes.

How will you check your answers?

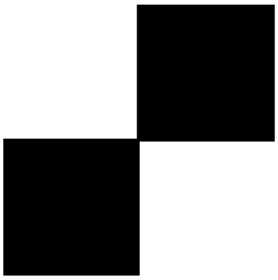
(A)



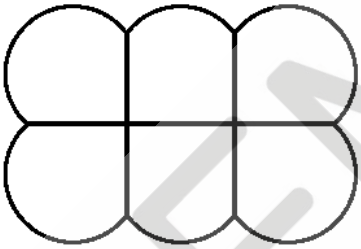
(B)



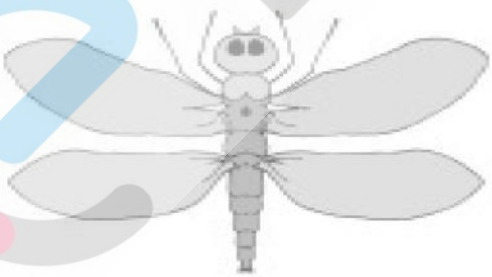
(C)



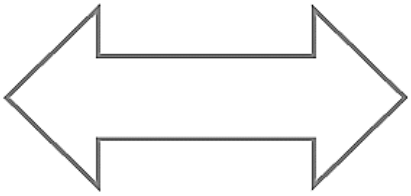
(D)



(E)

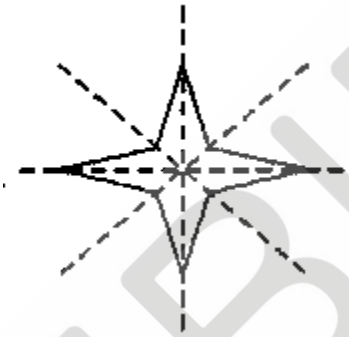


(F)



Solution:

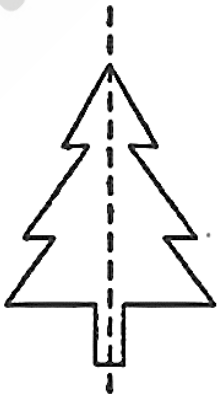
(A) The given figure has 4 lines of symmetry. The lines of symmetry are as shown below:



From the given figure, let us draw the sketch of the given figure on a white paper.

Now we can verify our answer by folding it along the line of symmetry.

(B) The given figure has one line of symmetry. The line of symmetry is as shown below:



From the given figure, let us draw the sketch of the given figure on a white paper.

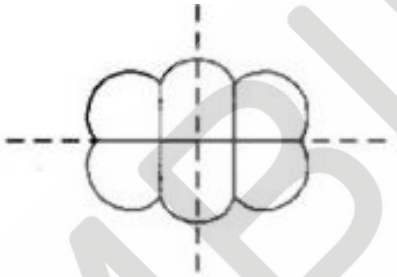
Now we can verify our answer by folding it along the line of symmetry.

(C) The given figure has 2 lines of symmetry. The lines of symmetry are as shown below:

From the given figure, let us draw the sketch of the given figure on a white paper.

Now we can verify our answer by folding it along the line of symmetry.

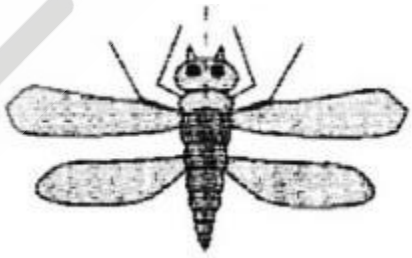
(D) The given figure has 2 lines of symmetry. The lines of symmetry are as shown below:



From the given figure, let us draw the sketch of the given figure on a white paper.

Now we can verify our answer by folding it along the line of symmetry.

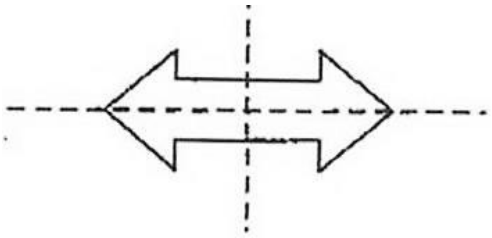
(E) The given figure has 1 line of symmetry. The line of symmetry is as shown below:



From the given figure, let us draw the sketch of the given figure on a white paper.

Now we can verify our answer by folding it along the line of symmetry.

(F) The given figure has 2 lines of symmetry. The lines of symmetry are as shown below:

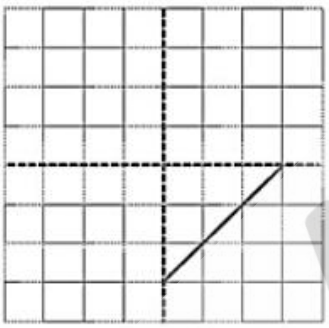


From the given figure, let us draw the sketch of the given figure on a white paper.

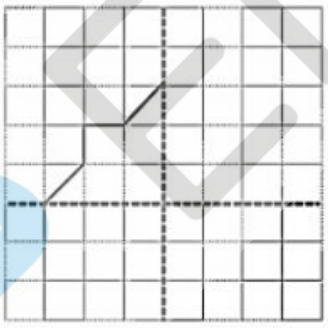
Now we can verify our answer by folding it along the line of symmetry.

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.

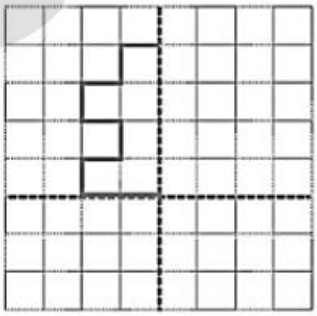
(A)



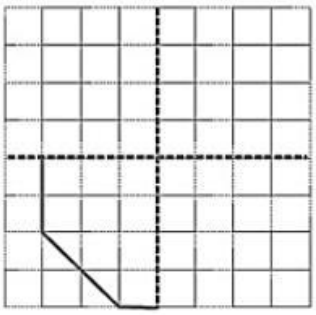
(B)



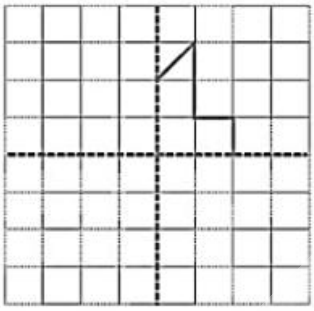
(C)



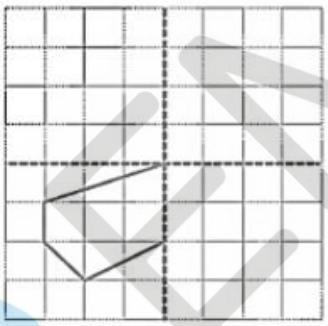
(D)



(E)



(F)

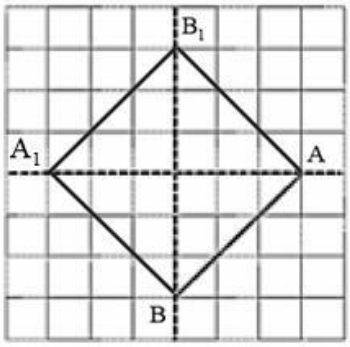


How did you go about completing the picture?

Solution:

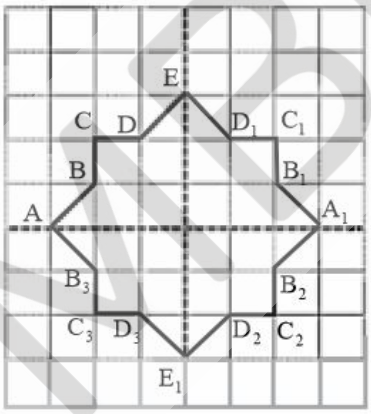
The following are the complete figures drawn such that they are symmetric with respect to the two dotted lines.

(A)



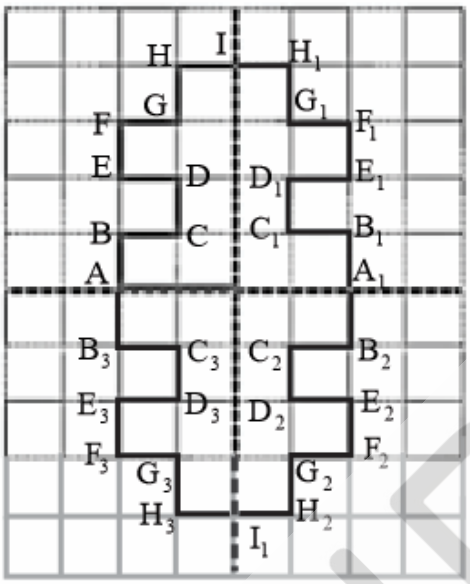
When we will observe AB on horizontal dotted line, point B will be visible at B_1. Hence, we can draw AB_1. Again, when we will observe BAB_1 on vertical dotted line, Point A will be visible at A_1. Hence, we can draw A_1B and A_1B_1. Now resulting diagram is symmetric about given two lines of symmetry.

(B)



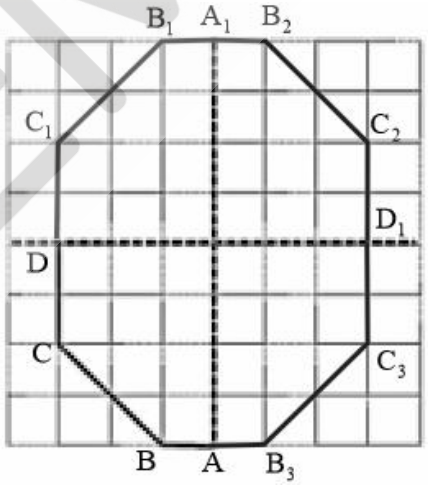
When we will observe AB on vertical dotted line, point A will be visible at A_1 and point B will be visible at B_1. Similarly, points C and D will be visible at points C_1 and D_1. Hence, we can draw ED_1, D_1C_1, C_1B_1 and B_1A_1. Again, when we will observe A to E and E to A_1 on horizontal dotted line, we will get A_1 to E_1 and E_1 to A. Now resulting diagram is symmetric about given two lines of symmetry.

(C)



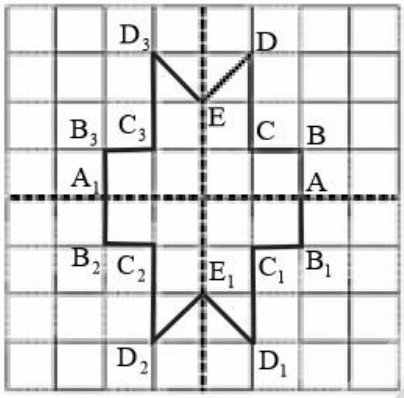
When we will observe AB on vertical dotted line, point A will be visible at A_1 and point B will be visible at B_1. Similarly, points C, D, E, F, G and H will be visible at points C_1, D_1, E_1, F_1, G_1 and H_1. Hence, we can draw IH_1, H_1G_1, G_1F_1, F_1E_1, E_1D_1, D_1C_1, C_1B_1 and B_1A_1. Again, when we will observe A to I and I to A_1 on horizontal dotted line, we will get A_1 to I_1 and I_1 to A. Now resulting diagram is symmetric about given two lines of symmetry.

(D)



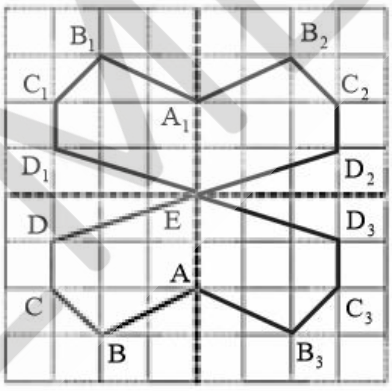
When we will observe AB on horizontal dotted line, point A will be visible at A_1 and point B will be visible at B_1. Similarly, point C will be visible at point C_1. Hence, we can draw DC_1, C_1B_1 and B_1A_1. Again, when we will observe A to D and D to A_1 on vertical dotted line, we will get A_1 to D_1 and D_1 to A. Now resulting diagram is symmetric about given two lines of symmetry.

(E)



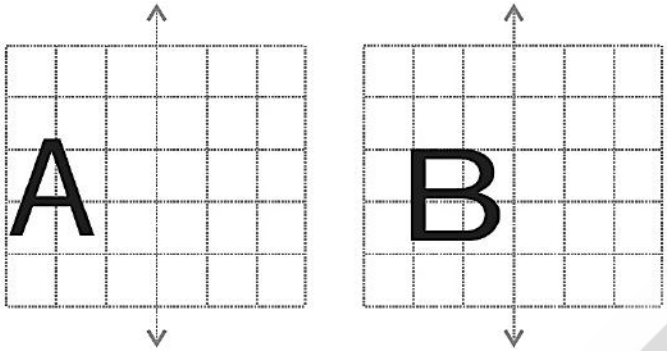
When we will observe AB on horizontal dotted line, point B will be visible at B_1. Similarly, points C, D and E will be visible at points C_1, D_1 and E_1. Hence, we can draw E_1D_1, D_1C_1, C_1B_1 and B_1A. Again, when we will observe E to A and A to E_1 on vertical dotted line, we will get E_1 to A_1 and A_1 to E. Now resulting diagram is symmetric about given two lines of symmetry.

(F)



When we will observe AB on horizontal dotted line, point A will be visible at A_1 and point B will be visible at B_1. Similarly, points C and D will be visible at points C_1 and D_1. Hence, we can draw ED_1, D_1C_1, C_1B_1 and B_1A_1. Again, when we will observe A to E and E to A_1 on vertical dotted line, we will get A_1 to E and E to A on opposite side. Now resulting diagram is symmetric about given two lines of symmetry.

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?

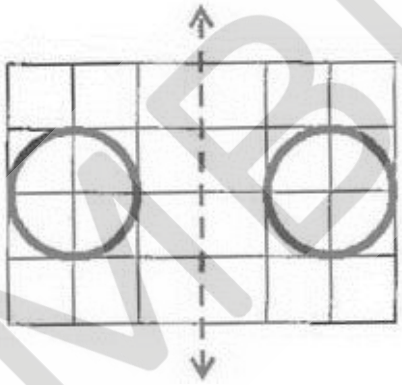


Try for O E M N P H L T S V X

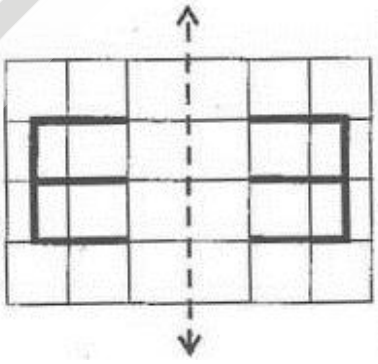
Solution:

The given letters after reflection would appear as follows:

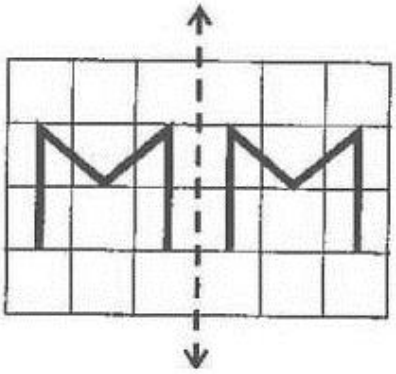
O after reflection will remain the same because it has vertical line of symmetry.



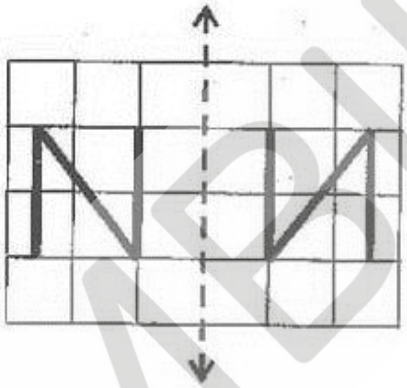
Letter E after reflection will appear different because it does not have vertical line of symmetry.



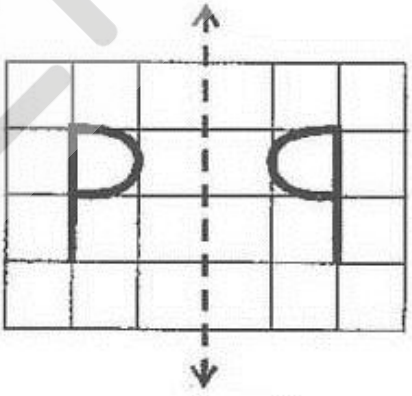
Letter M after reflection will appear the same because it has vertical line of symmetry.



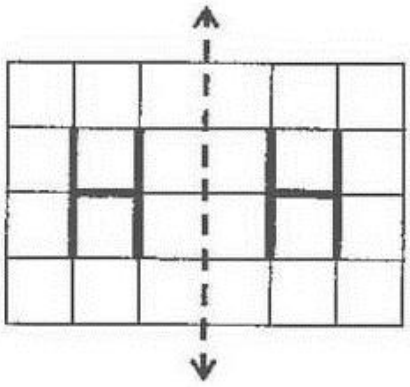
Letter N after reflection will appear different because it does not have vertical line of symmetry.



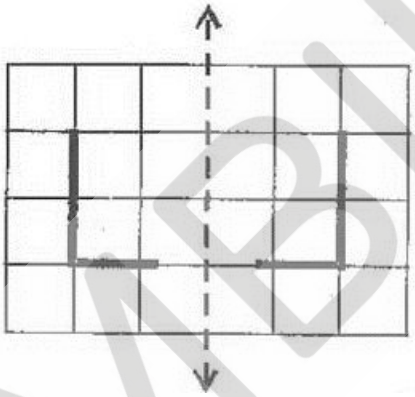
Letter P after reflection will appear different because it does not have vertical line of symmetry.



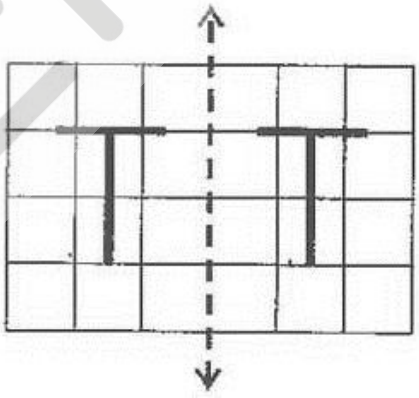
Letter H after reflection will appear the same because it has vertical line of symmetry.



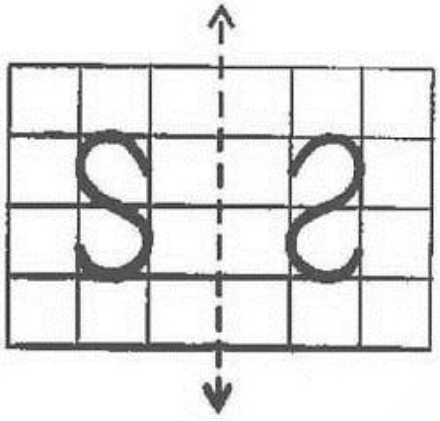
Letter L after reflection will appear different because it does not have vertical line of symmetry.



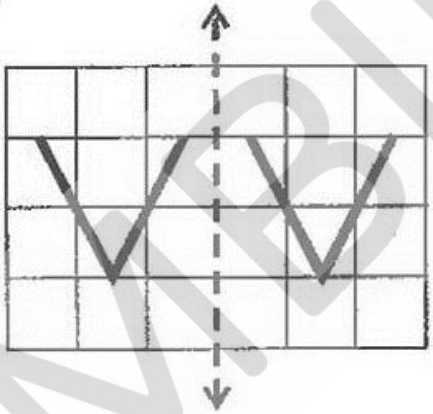
Letter T after reflection will appear the same because it has vertical line of symmetry.



Letter S after reflection will appear different because it does not have vertical line of symmetry.



Letter V after reflection will appear the same because it has vertical line of symmetry.



Letter X after reflection will appear the same because it has vertical line of symmetry.