Mathematics NCERT Grade 6, Chapter 13: **Symmetry**- **Symmetry** is quite a common term used in daily life. This chapter will explain in detail about **symmetry**. Section 13.2 strengthens the ideas on **making symmetric figures: Ink-blot devils**.
Students will be familiarized with the concept of the **Figures with Two Lines of Symmetry** and with the topic **Figures with Multiple(more than two) Lines of Symmetry.**
Now the question arises, what is **line symmetry**?

- Well, the answer is if a **line** can be drawn dividing the figure into **two identical parts**, then that line is called **line of symmetry**.
- A figure may have **no line of symmetry, only one line of symmetry**, **two lines of symmetry** or **multiple lines of symmetry**.
- The **line symmetry** is closely related to **mirror reflections**.

Number of lines of symmetry	Example
No line of symmetry	scalene triangle
Only one line of symmetry	isosceles triangle
Two lines of symmetry	rectangle
Three lines of symmetry	equilateral triangle

In this chapter, the focus will be given on **Reflection and symmetry and its application.**

- **Symmetry** has plenty of **applications** in everyday life as in **art, architecture, textile technology, design creations, geometrical reasoning, Kolams, Rangoli, Paper decoration, Kaleidoscope etc.**

Each section contains solved and unsolved questions for the purpose of understanding and practising respectively.
The chapter is supplemented with images to make the concept more understandable.
For a perfect finish, important points are mentioned in the form of summary at the end of the chapter- **symmetry.**

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Question 1:

List any four symmetrical objects from your home or school.

ANSWER:

Paper sheet, Glass, CD, Bucket

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Question 2:

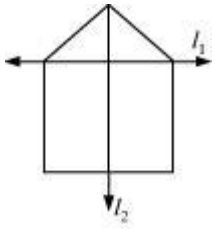For the given figure, which one is the mirror line, l_1 or l_2?

ANSWER:

Line l_2 is the mirror line of this figure. This is because when the given figure is folded about the line l_2, the left part can exactly cover the right part and vice-versa.
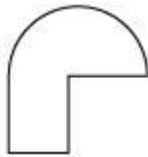
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Question 3:

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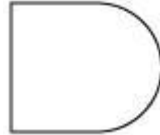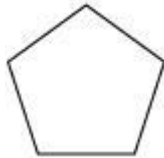

(a)	(b)	(c)

(d)	(e)	(f)

ANSWER:

(a) Yes

(b) Yes

(c) No

(d) Yes

(e) Yes

(f) Yes

Line of symmetry is shown in the following figures.
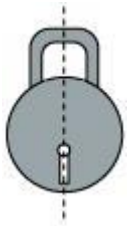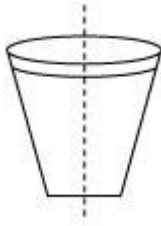
(a)   (b)   (d)

(e)   (f)
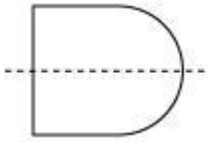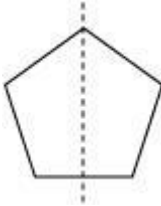
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Question 4:

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) |
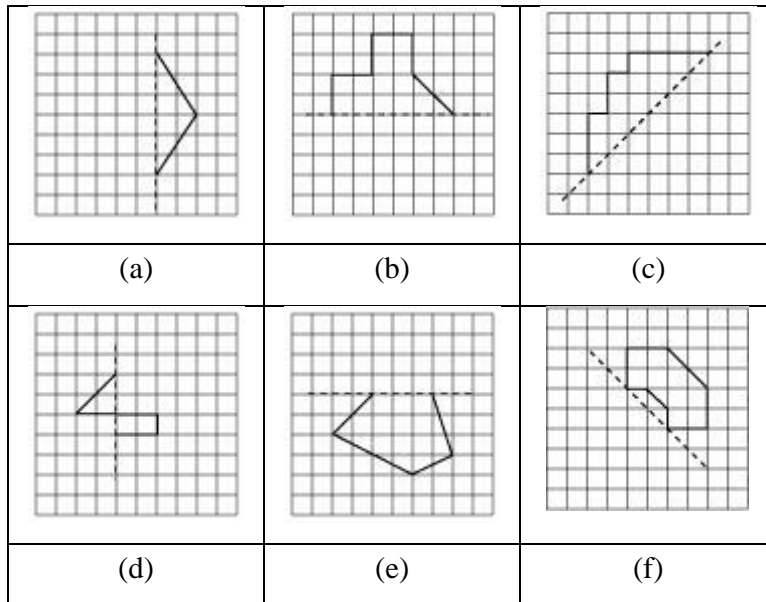
ANSWER:

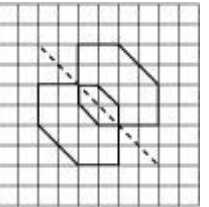To make the dotted line as the line of symmetry, the given figures can be drawn as follows.

(a)

(b)

(c)

(d)

(e)

(f)

Page No 263:
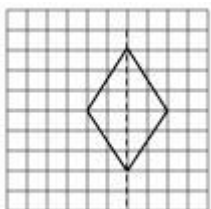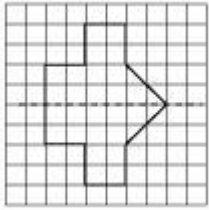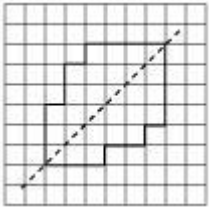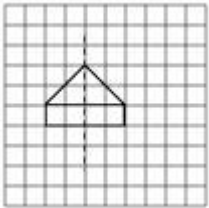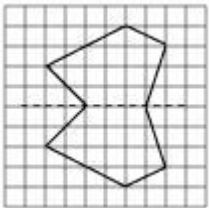
Question 5:

In the figure, *l* is the line of symmetry.

Complete the diagram to make it symmetric.

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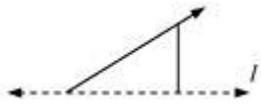
ANSWER:

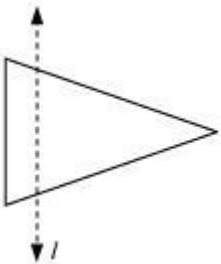To make the diagram symmetric, it can be completed as follows.
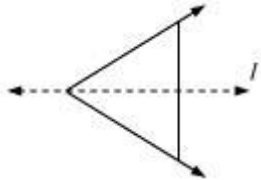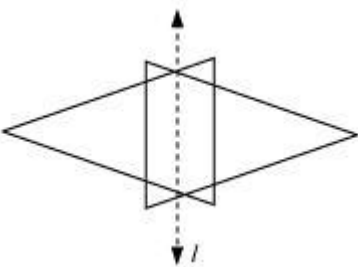

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Question 6:

In figure, *l* is the line of symmetry.

Draw the image of the triangle and complete the diagram so that it becomes symmetric.

ANSWER:

The required triangle can be formed as follows.

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Question 1:

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

(a)   (b)   (c)
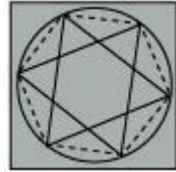
(d)   (e)   (f)
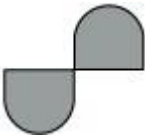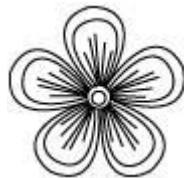
(g)   (h)   (i)

**ANSWER:**

(a) There are 4 lines of symmetry for the given figure.

(b) There are 4 lines of symmetry for the given figure.

(c) There are 4 lines of symmetry for the given figure.

(d) There is only 1 line of symmetry for the given figure.

(e) There are 6 lines of symmetry for the given figure.

(f) There are 6 lines of symmetry for the given figure.

(g) There is no line of symmetry for the given figure.

(h) There is no line of symmetry for the given figure.

(i) There are 3 lines of symmetry for the given figure.

The lines of symmetry in the above figures can be represented as follows.
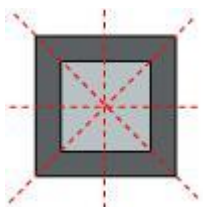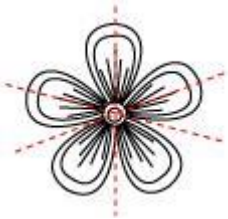

(a)   (b)   (c)
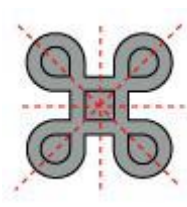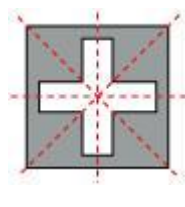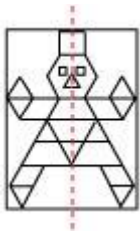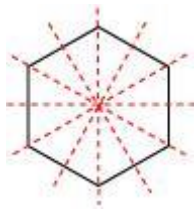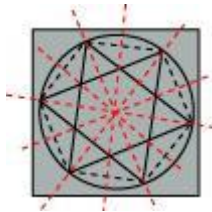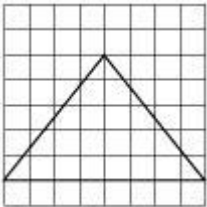
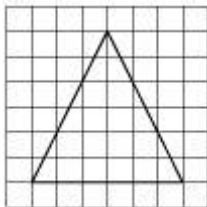(d)   (e)   (f)

(i)
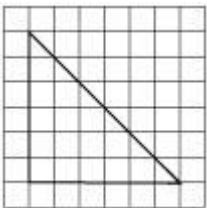
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Question 2:

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!)
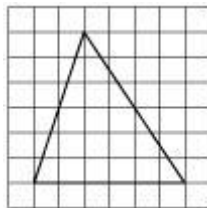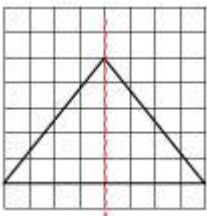

(a)   (b)

(c)   (d)

ANSWER:

(a) It is an isosceles triangle. There will be only 1 line of symmetry.
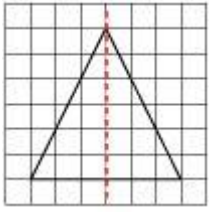

(b) It is an isosceles triangle. There will be only 1 line of symmetry.

(c) It is a right-angled triangle. There will be only 1 line of symmetry.
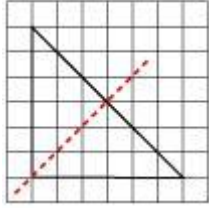
(d) It is a scalene triangle. There will be no line of symmetry.

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Question 3:

Complete the following table.

Shape	Rough figure	Number of lines of symmetry
Equilateral triangle		3
Square	-	-
Rectangle	-	-
Isosceles triangle	-	-
Rhombus	-	-
Circle	-	-
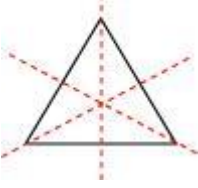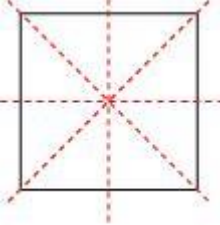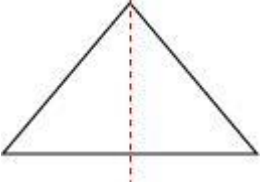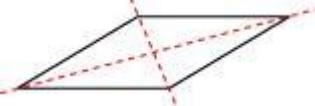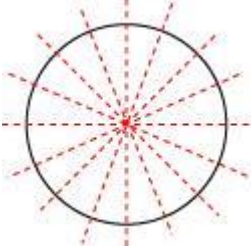
ANSWER:

The given table can be completed as follows.

Shape	Rough figure	Number of lines of symmetry

Equilateral triangle		3
Square		4
Rectangle		2
Isosceles triangle		1
Rhombus		2
Circle		Infinite

In case of a circle, there are infinite lines. In the above table, only some lines of symmetry are drawn. More symmetric lines can be similarly drawn for it.

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Question 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?

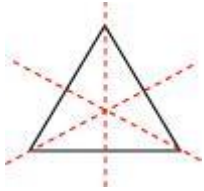(d) no lines of symmetry?

Sketch a rough figure in each case.

ANSWER:

(a) Yes, we can make an isosceles triangle which has 1 line of symmetry.
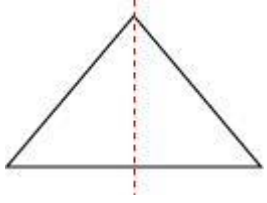
(b) No, we cannot draw such a triangle.

(c) Yes, we can make an equilateral triangle which has 3 lines of symmetry.

(d) Yes, we can make a scalene triangle which has no line of symmetry.

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Question 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.)
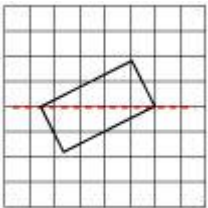
ANSWER:

(a) A triangle with only 1 horizontal line of symmetry and no other vertical line of symmetry can be sketched as follows.
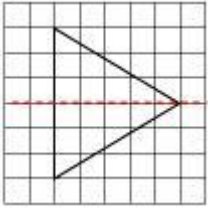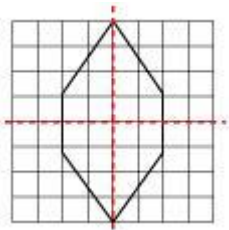

(b) A quadrilateral with both horizontal and vertical lines of symmetry
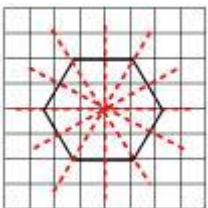
can be drawn as follows.
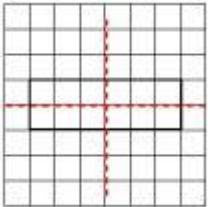
(c) A quadrilateral with a horizontal line of symmetry but no vertical line of symmetry can be drawn as follows.

(d) A hexagon with exactly two lines of symmetry can be sketched as follows.

(e) A hexagon with six lines of symmetry can be sketched as follows.

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Question 6:

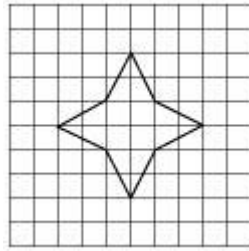Trace each figure and draw the lines of symmetry, if any:
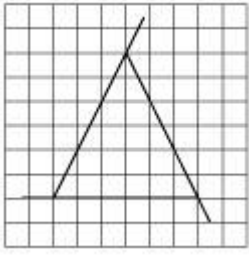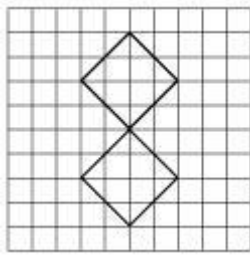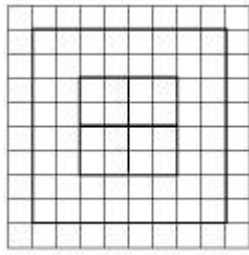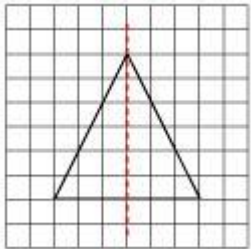
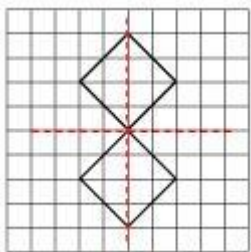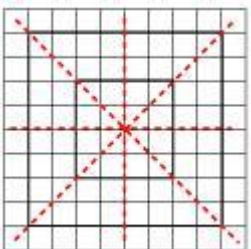(a) (b) (c)
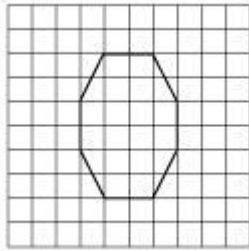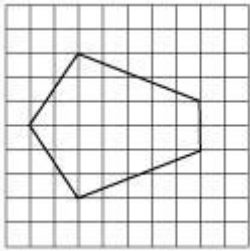
(d) (e) (f)

ANSWER:

(a) The given figure is an isosceles triangle. Therefore, there will be 1 line

of symmetry.

(b) The given figure has 2 lines of symmetry.

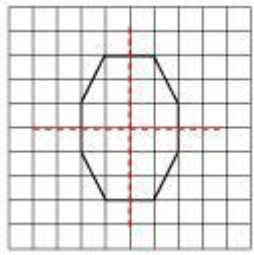(c) The given figure has 4 lines of symmetry.

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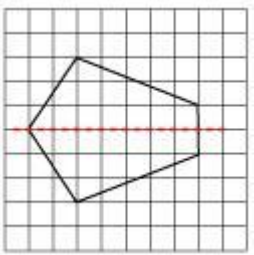**CLASS VI: MATHEMATICS NCERT SOLUTIONS**
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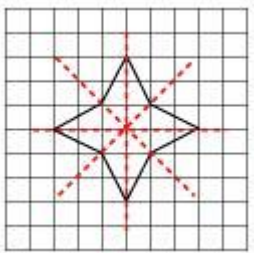CLICK HERE TO JOIN WHATSAPP GROUP

(d) The given figure is an octagonal having 2 lines of symmetry.

(e) The given figure has only 1 line of symmetry.

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

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Question 7:

Consider the letters of English alphabet, 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) A, H, I, M, O, T, U, V, W, X, Y

(b) B, C, D, E, H, I, K, O, X
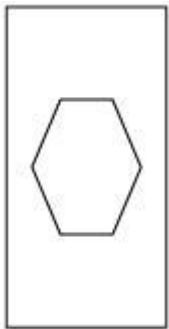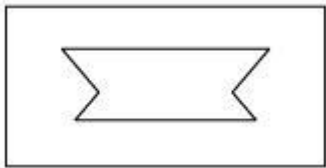
(c) F, G, J, L, N, P, Q, R, S, Z

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Question 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.
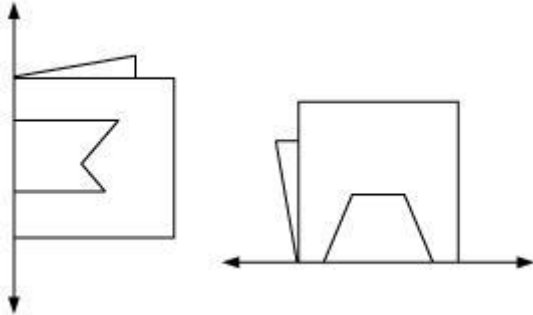
ANSWER:

The complete figures will be as follows.

Page No 271:

Question 1:

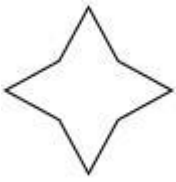Find the number of lines of symmetry in each of the following shapes. How will you check your answers?
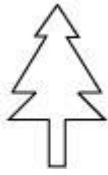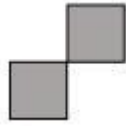
(a)   (b)   (c)
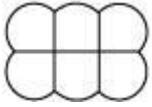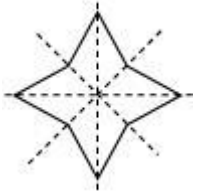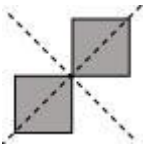
(d)   (e)   (f)

ANSWER:

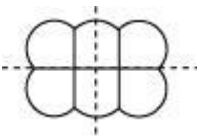(a) It can be observed that there are 4 lines of symmetry.

(b) It can be observed that there is only 1 line of symmetry.

(c) It can be observed that there are 2 lines of symmetry.
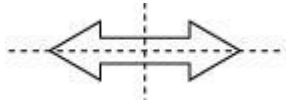
(d) It can be observed that there are 2 lines of symmetry.

(e) It can be observed that there is only 1 line of symmetry.
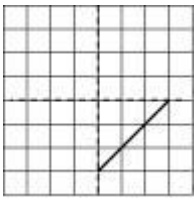
(f) It can be observed that there are 2 lines of symmetry.
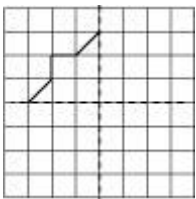

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Question 2:

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.
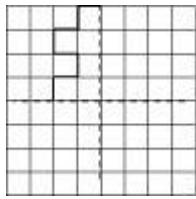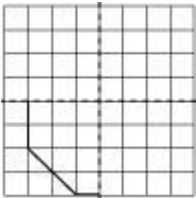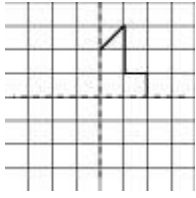
How did you go about completing the picture?
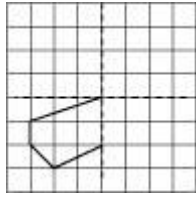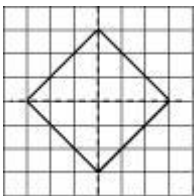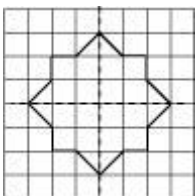

| (a) | (b) | (c) |

| (d) | (e) | (f) |

ANSWER:

These figures can be completed by drawing similar parts as shown in these figures, first about the vertical line of symmetry and then about the horizontal line of symmetry, or first about the horizontal line of symmetry and then about the vertical line of symmetry.
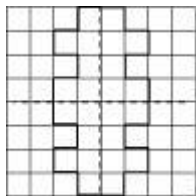
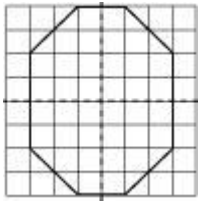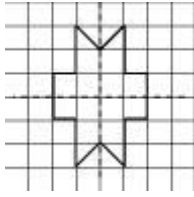The completed figures will be as follows.
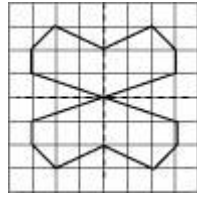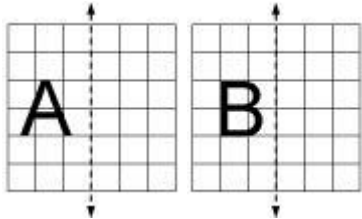

| (a) | (b) | (c) |

(d)   (e)   (f)

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Question 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?
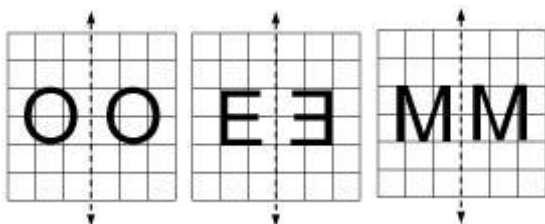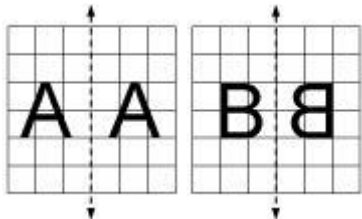

Try for

OEMNPHLTSVX

ANSWER:
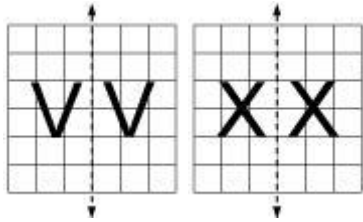
The mirror images of these figures will be as follows.
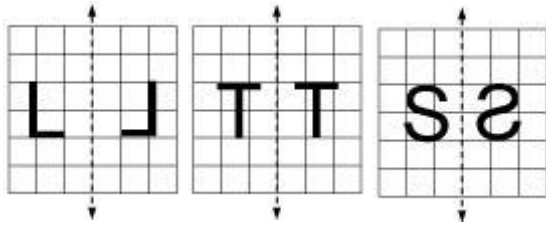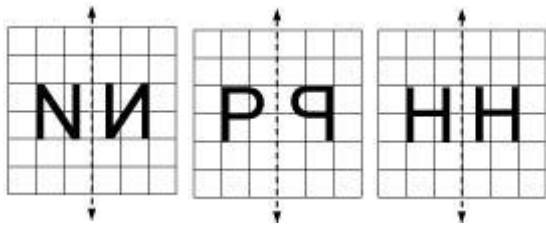
The letters that have vertical line of symmetry will have same mirror images. These letters are O, M, H, T, V, X and hence, these letters will look the same.