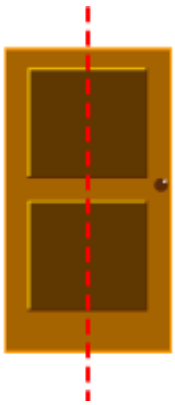
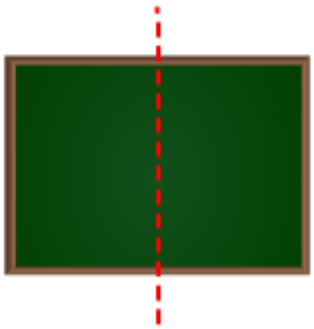
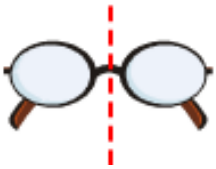
Symmetry

Exercise 17.1

Question: 1

List any four symmetrical objects from your home or school. Also mention the line of symmetry.

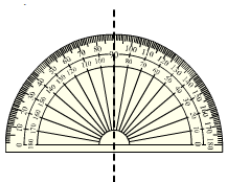
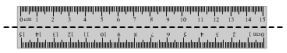
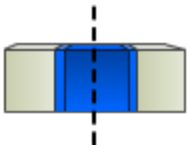
Solution:

			
(i) A gate	(ii) A green board	(iii) A pair of spectacles	(iv) A glass

Question: 2

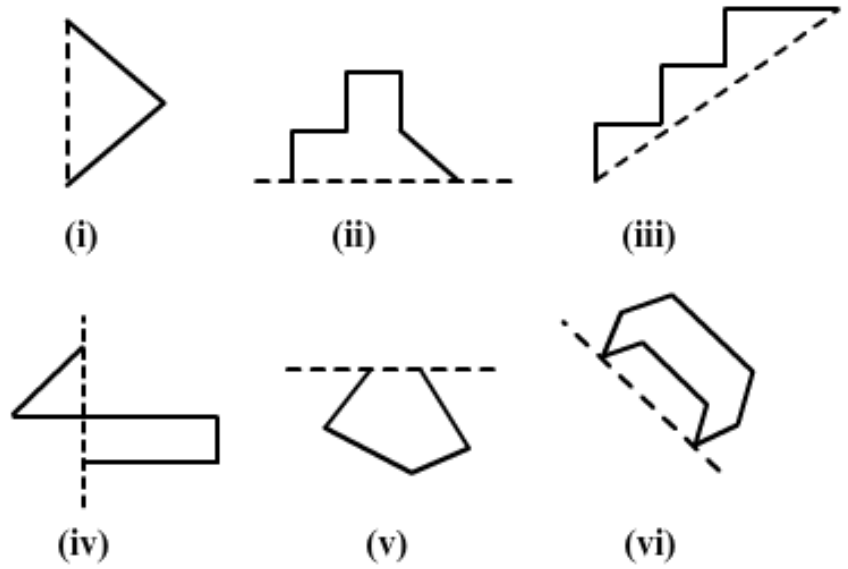
Identify the symmetrical instruments from your mathematical instrument box.

Solution:

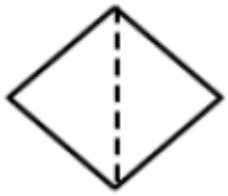
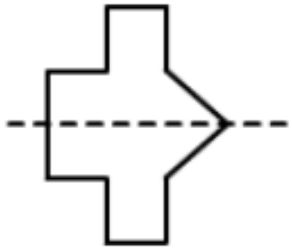
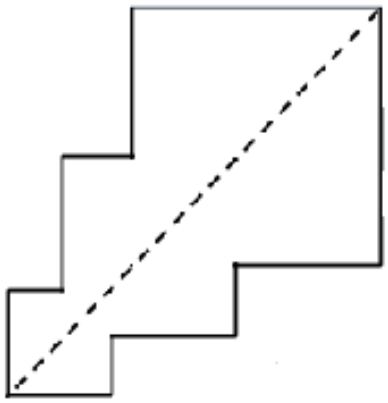
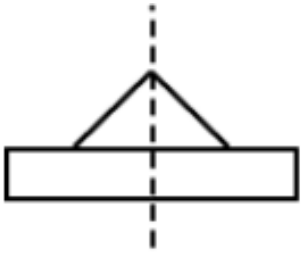
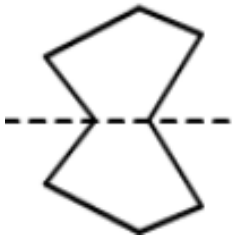
				
(i) A protractor	(ii) A divider	(iii) A ruler (scale)	(iv) A glass	(v) A pencil

Question: 3

Copy each of the following on a squared paper and compute then in such a way that the dotted line is the line of symmetry.



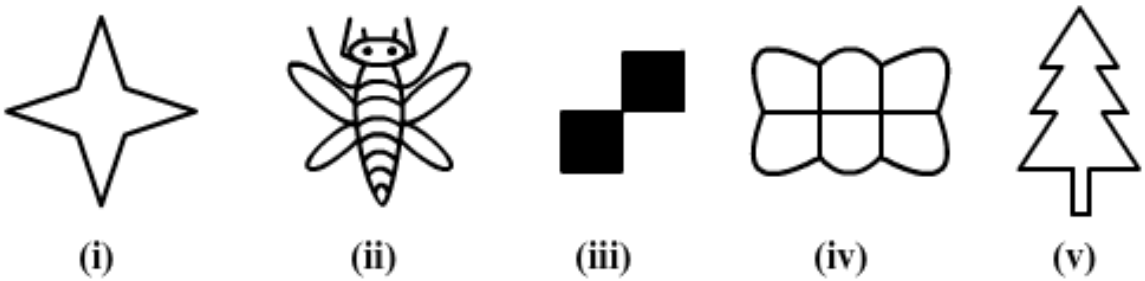
Solution:

		
(i)	(ii)	(iii)
		
(iv)	(v)	(vi)

Exercise 17.2

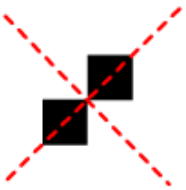
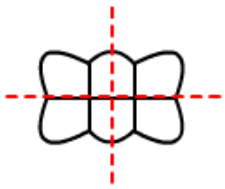
Question: 1

Find the number of line of symmetry in each of the following shapes



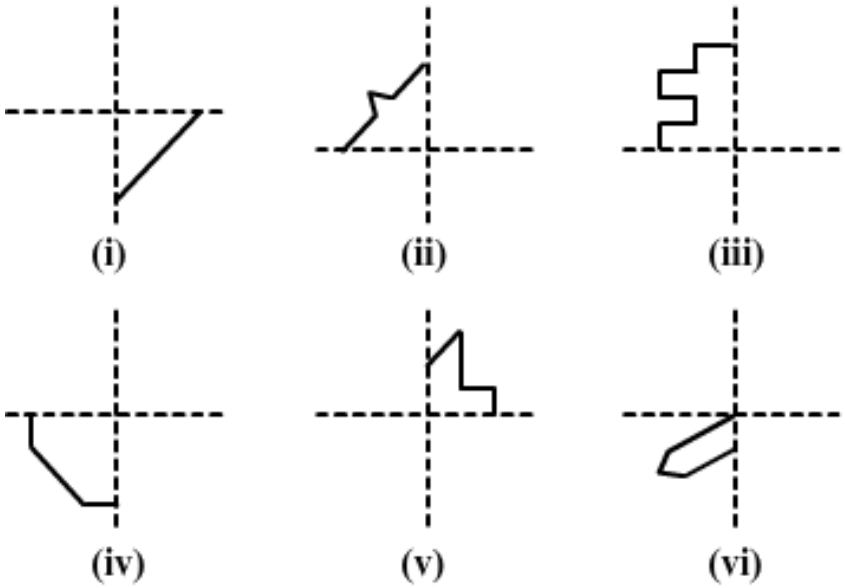
(i) (ii) (iii) (iv) (v)

Solution:

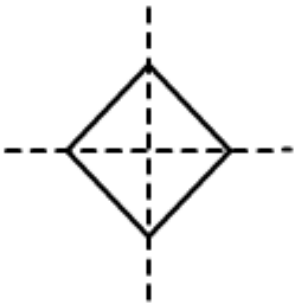
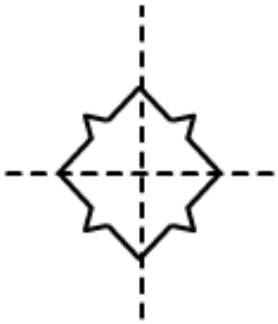
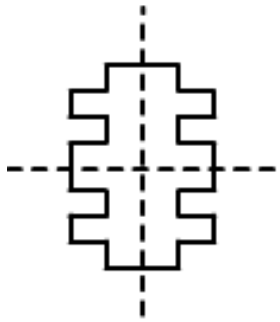
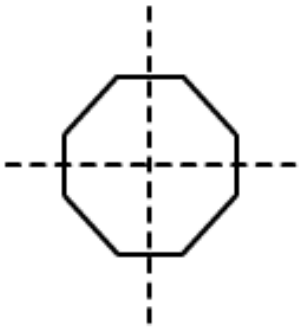
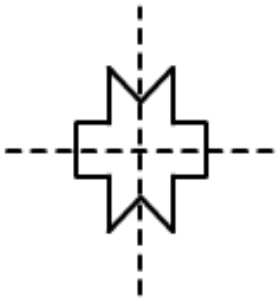
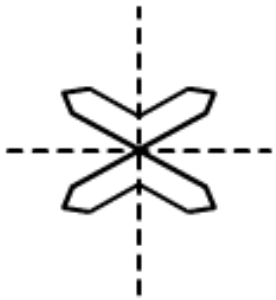
				
(i)	(ii)	(iii)	(iv)	(v)

Question: 2

Copy the following drawings on a paper and compute each one of them in such a way that resulting figure has two dotted lines as two lines of symmetry:



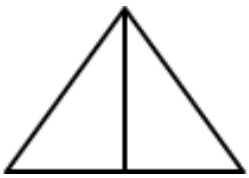
Solution:

		
(i)	(ii)	(iii)
		
(iv)	(v)	(vi)

Exercise 17.3

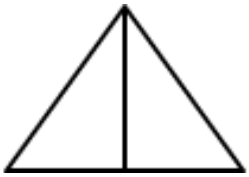
Question: 1

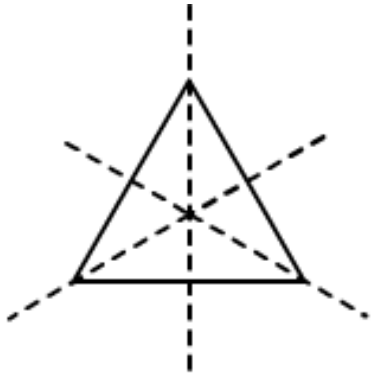
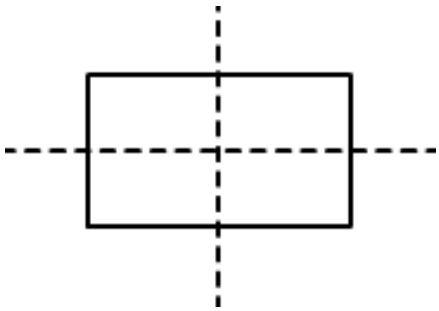
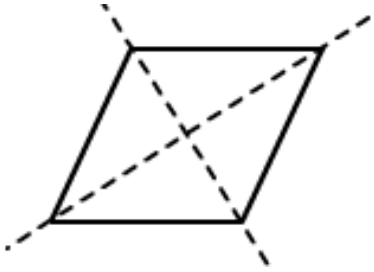
Complete the following table:

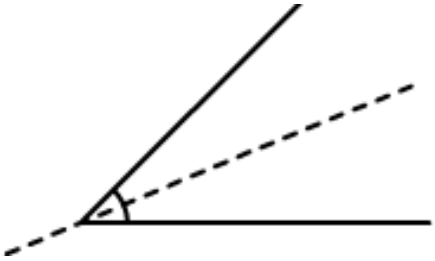
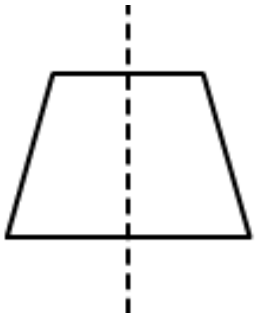
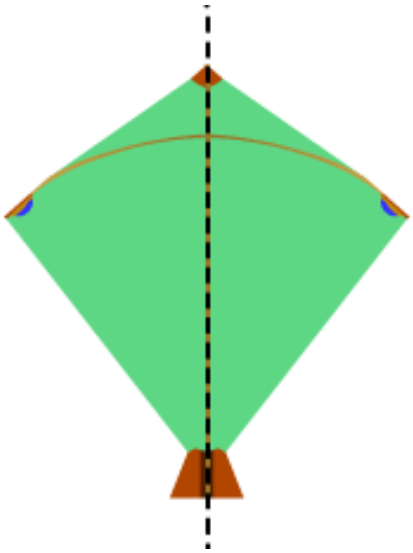
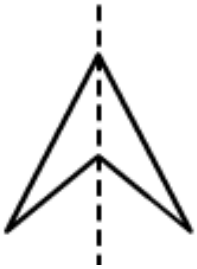
Shapes	Rough figure	Number of lines of symmetry
(i) scalene triangle		0
(ii) Isosceles triangle		1
(iii) equilateral triangle		
(iv) Rectangle		
(v) Parallelogram		
(vii) Rhombus		
(viii) Line		
(ix) Line segment		
(x) Angle		

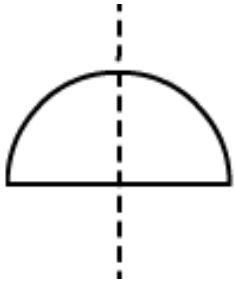
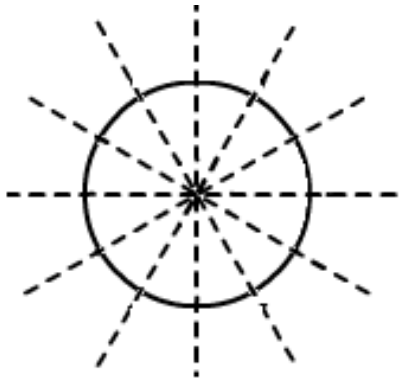
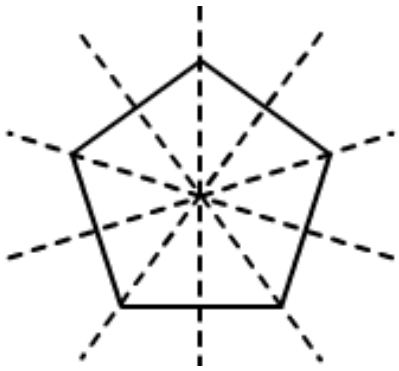
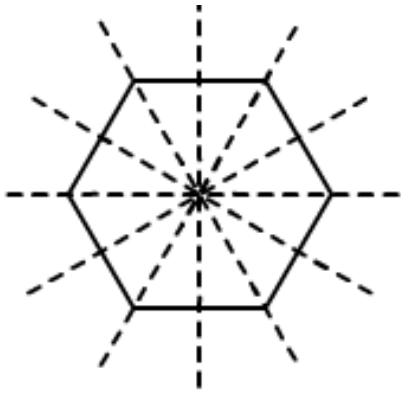
(xi) Isosceles trapezium	
(xii) Kite	
(xiii) Arrow head	
(xiv) Semi – circle	
(xv) Circle	
(xvi) Regular pentagon	
(xvii) Regular hexagon	

Solution:

Shapes	Rough figure	Number of lines of symmetry
(i) scalene triangle		0
(ii) Isosceles triangle		1
(iii) equilateral triangle		3

		
(iv) Rectangle		4
(v) Parallelogram		0
(vii) Rhombus		2
(viii) Line Infinitely		Many
(ix) Line segment		1

(x) Angle		1
(xi) Isosceles trapezium		1
(xii) Kite		1
(xiii) Arrow head		1
(xiv) Semi – circle		1

		
(xv) Circle Infinitely		Many
(xvi) Regular pentagon		5
(xvii) Regular hexagon		6

Question: 2

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

(i)Vertical line of symmetry

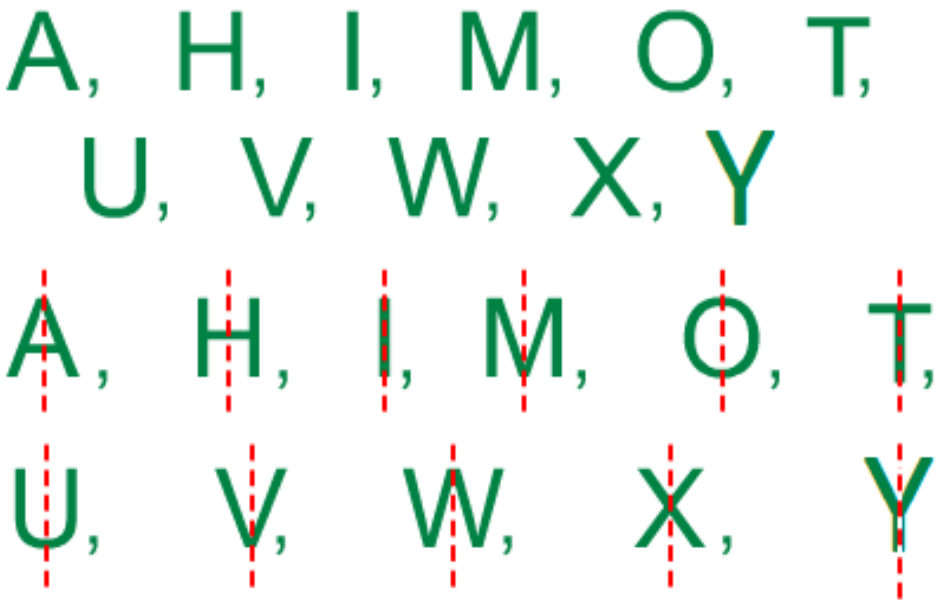
(ii)Horizontal line of symmetry

(iii)Vertical and Horizontal line of symmetry

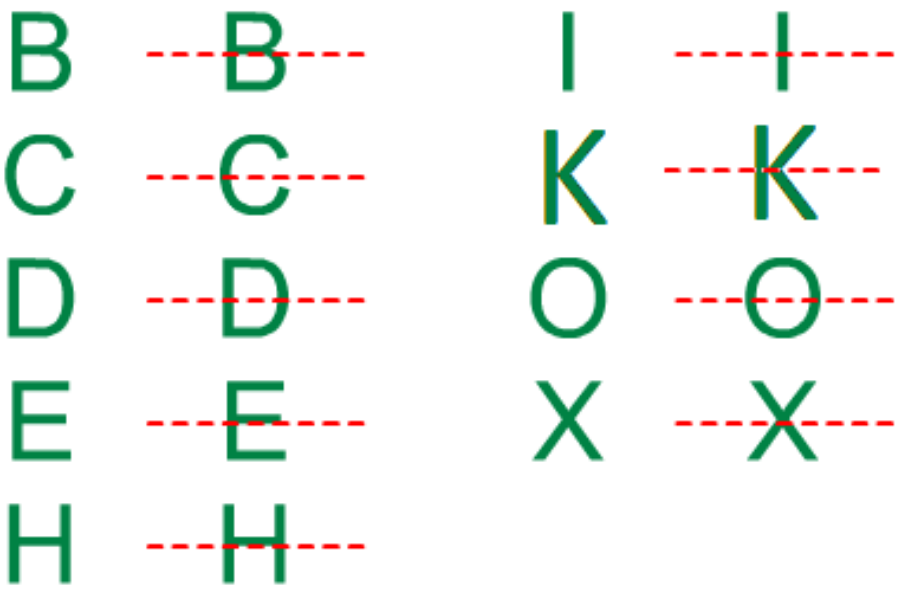
(iv)No line of symmetry

Solution:

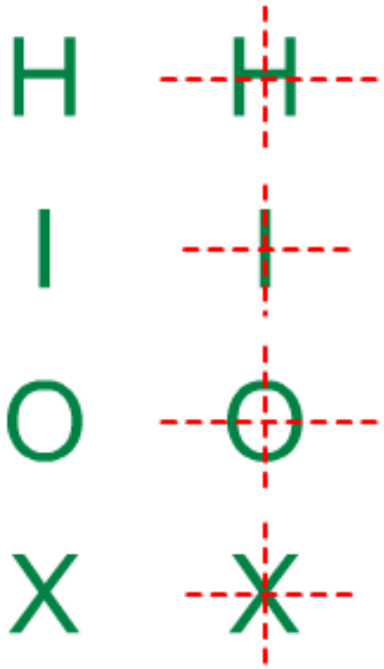
(i) Vertical line of symmetry:



(ii) Horizontal line of symmetry:



(iii) Vertical and Horizontal line of symmetry:



(iv) No line of symmetry:

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

Question: 3

No line of symmetry?

(i) Exactly one line of symmetry.

(ii) Exactly two line of symmetry.

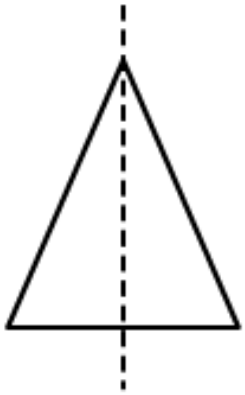
(iii) Three line of symmetry.

(iv) no lines of symmetry

Solution:

(i) Exactly one line of symmetry:

Yes; isosceles triangle

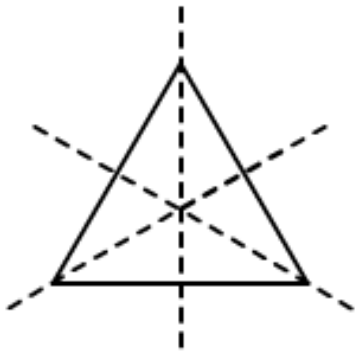


(ii) Exactly two line of symmetry:

No

(iii) Three line of symmetry:

Yes; equilateral triangle



(iv) no lines of symmetry

Yes; scalene triangle

Question: 4

On a squared paper, sketch the following:

(i) A triangle with a horizontal with both horizontal and vertical line of symmetry

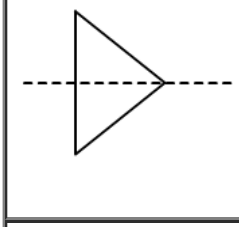
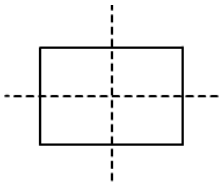
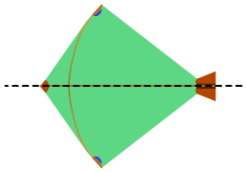
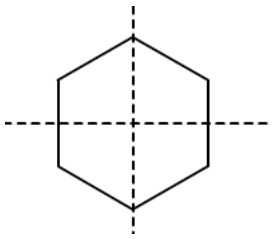
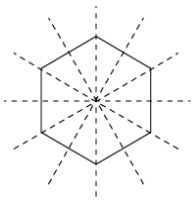
(ii) A quadrilateral with both horizontal and vertical lines of symmetry

(iii) A quadrilateral with horizontal but no vertical lines of symmetry

(iv) A hexagon with exactly two lines of symmetry

(v) A hexagon with exactly six lines of symmetry

Solution:

				
(i)	(ii)	(iii)	(iv)	(v)

Question: 5

Draw neat diagrams showing the line (or lines) of symmetry and give the specific name to the quadrilateral having:

(i) only one line of symmetry. How many such quadrilaterals are there?

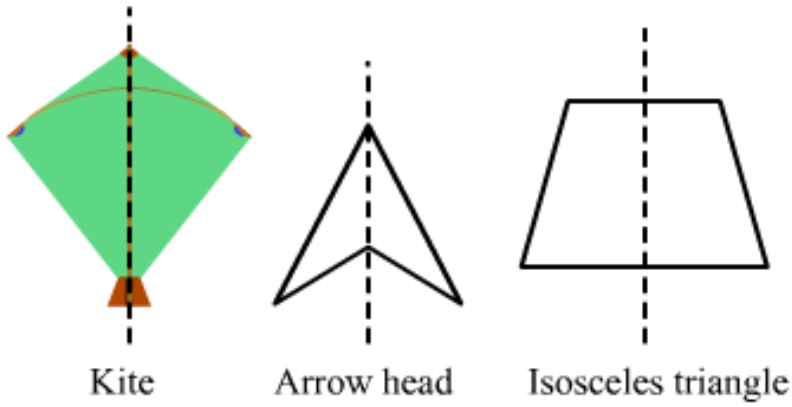
(ii) its diagonals as the only lines of symmetry

(iii) two lines of symmetry other than diagonals

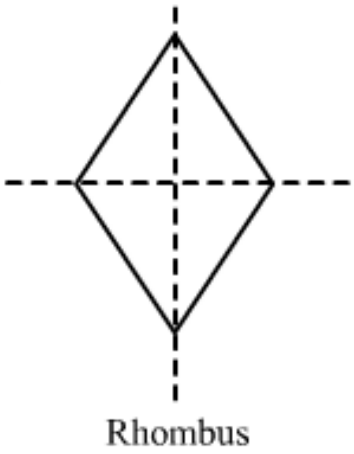
(iv) More than two lines of symmetry

Solution:

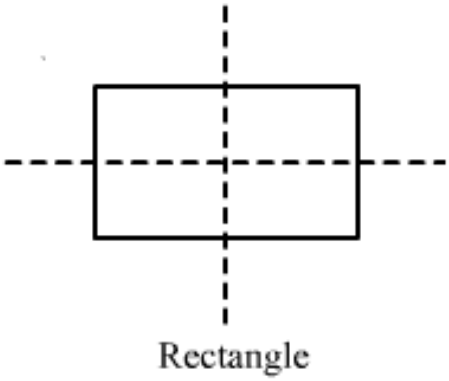
(i) only one line of symmetry



(ii) diagonals as the only lines of symmetry



(iii) two lines of symmetry other than diagonals:

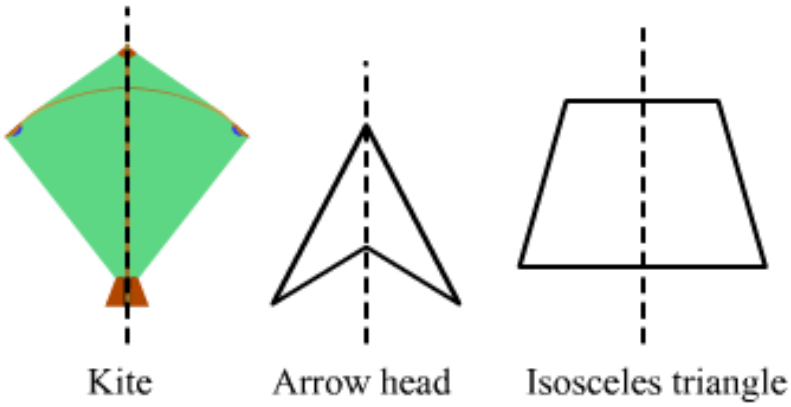


(iv) More than two lines of symmetry:

Question: 6

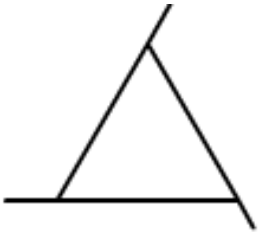
write the specific names of all the three quadrilaterals which have only one line of symmetry

Solution:



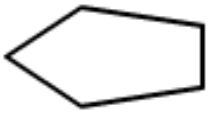
Question: 7

Trace each of the following figures and draw the lines of symmetry. If any

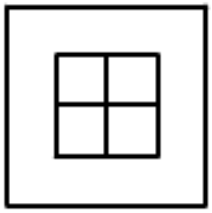


(i)

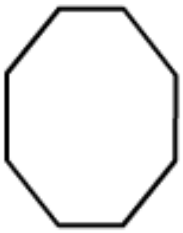
(ii)



(iii)



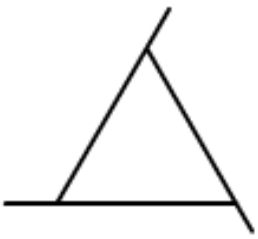
(iv)



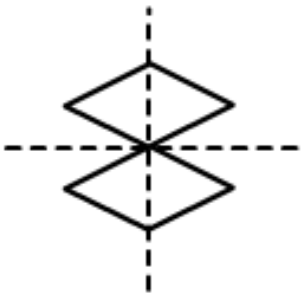
(v)

(vi)

Solution:



(i)



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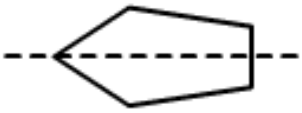

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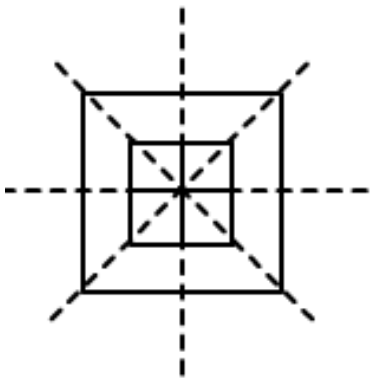

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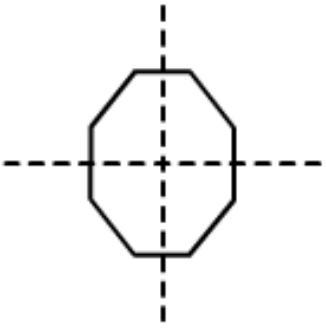
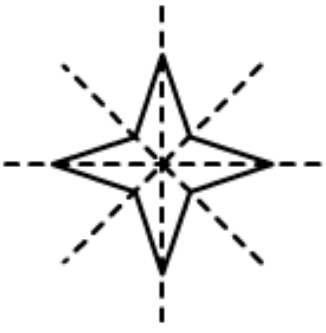


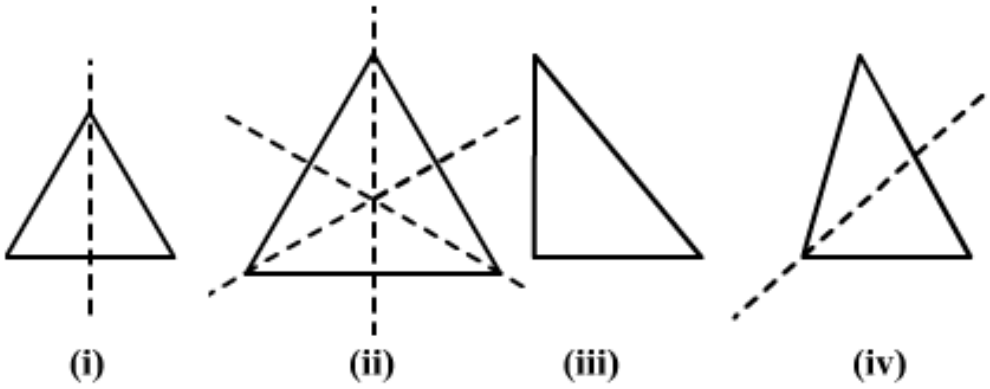
(v)



(vi)

Question: 8

On squared paper copy the triangle in each of the following figures. In each case draw the line(s) of symmetry if any and identify the type of the triangle



Solution:

(i) This is an isosceles triangle because it has only one line of symmetry.

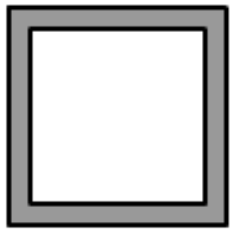
(ii) This is an Equilateral triangle because it has three lines of symmetry.

(iii) This is a right angled triangle because it has no line of symmetry.

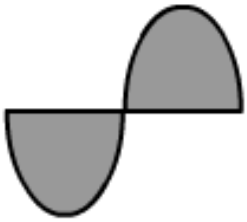
(iv) This is an isosceles triangle it has one line of symmetry.

Question: 9

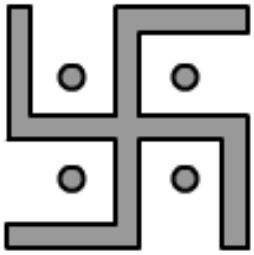
Find the lines of symmetry for each of the following shapes



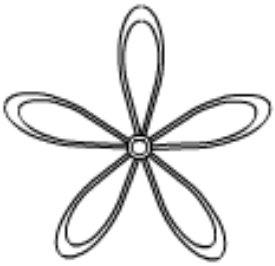
(i)



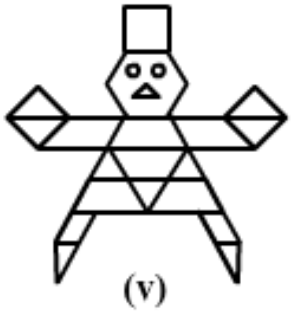
(ii)



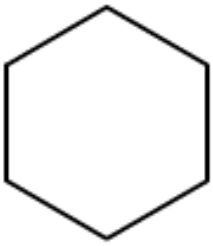
(iii)



(iv)

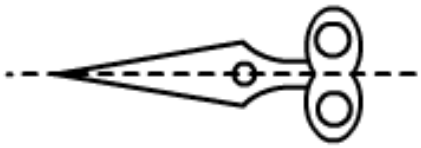


(v)



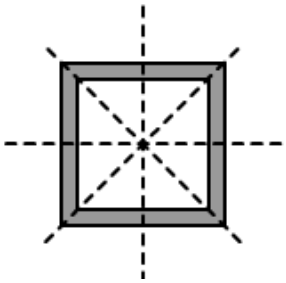
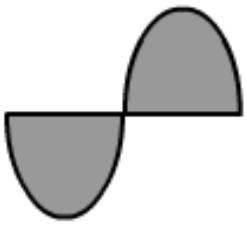
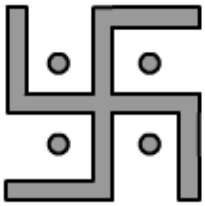
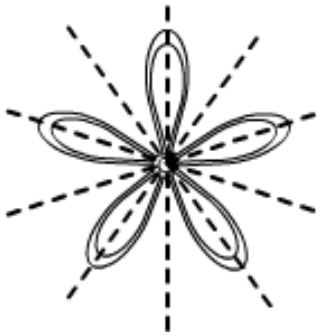
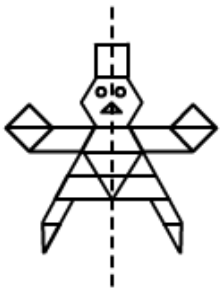
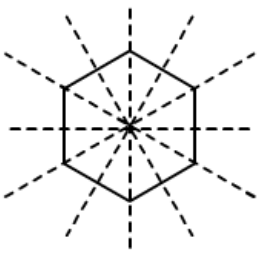
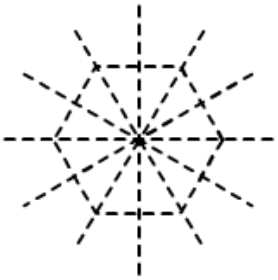
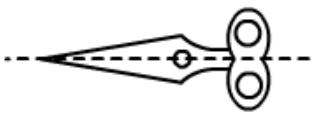
(vi)

(vii)



(viii)

Solution:

			
(i)	(ii)	(iii)	(iv)
			

(v)	(vi)	(vii)	(viii)

Question: 10

State whether the following statements are true or false:

(i) A right- angled triangle can have at most two lines of symmetry

(ii) An isosceles triangle with more than one line of symmetry must be an equilateral triangle

(iii) A pentagon with one line of symmetry can be drawn.

(iv) A pentagon with more than one line of symmetry must be regular

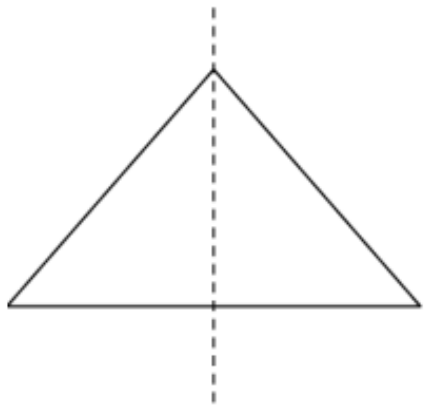
(v) A hexagon with one line of symmetry can be drawn

(vi) A hexagon with more than one line of symmetry must be regular

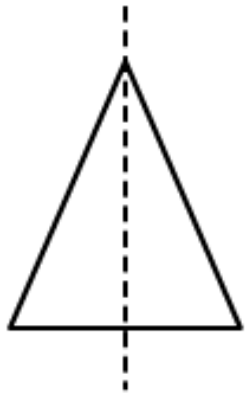
Solution:

(i)True

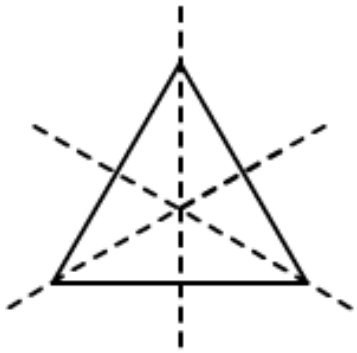
If it is an isosceles right angle triangle, then it can have only one line of symmetry at the most. Otherwise, a right angle triangle has no line of symmetry.



(ii) If an isosceles triangle has no more than one line of symmetry, then it must be an equilateral triangle. This is because an equilateral triangle has three lines of symmetry, and a triangle other than that cannot have two lines of symmetry.

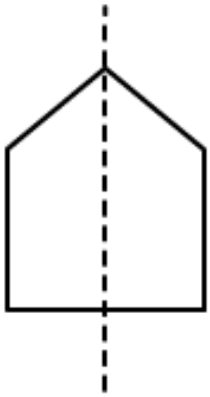


Isosceles triangle

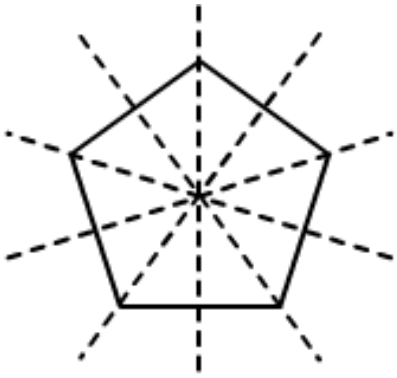


Equilateral triangle

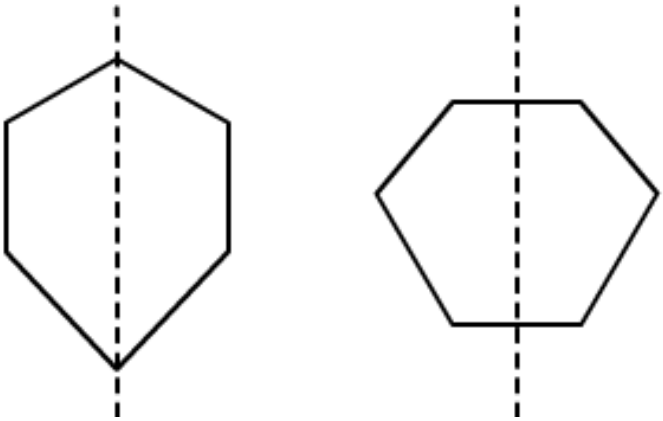
(iii)True



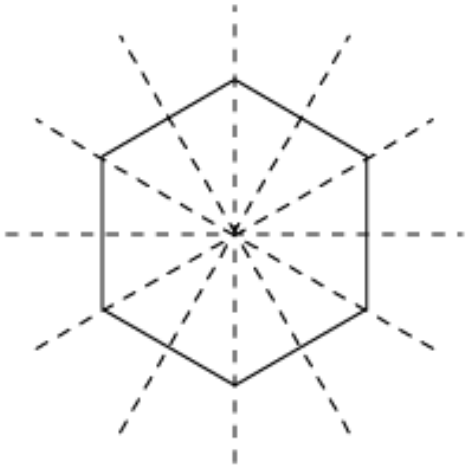
(iv)True



(v)True



(vi)True



Exercise 17.4

Question: 1

The total number of lines of symmetry of a scalene triangle is

(a) 1

(b) 2

(c) 3

(d) none of these

Solution:

(d) none of these

This is because the line of symmetry of a scalene triangle is 0.

Question: 2

The total number of lines of symmetry of an isosceles triangle is

(a) 1

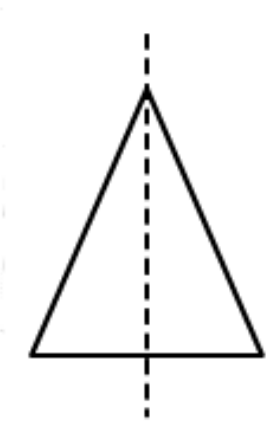
(b) 2

(c) 3

(d) none of these

Solution:

(a) 1



Question: 3

An equilateral triangle is symmetrical about each of its

(a) altitudes

(b) median

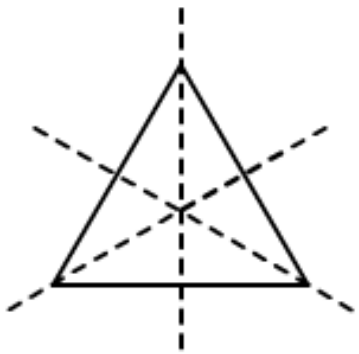
(c) angle of bisectors

(d) all of the above

Solution:

(d) all the above

In equilateral triangle altitudes, angle bisectors and medians are all the same.



Question: 4

The total number of lines of symmetry of a square is

(a) 1

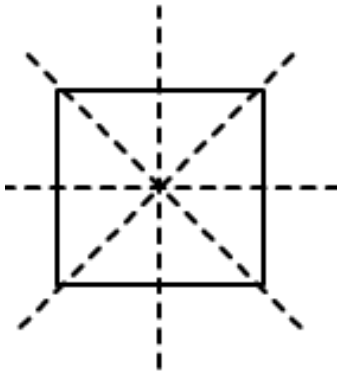
(b) 2

(c) 3

(d) 4

Solution:

(d) 4



Question: 5

A rhombus is symmetrical about

(a) each of its diagonals

(b) the line joining the mid-points of its opposite sides

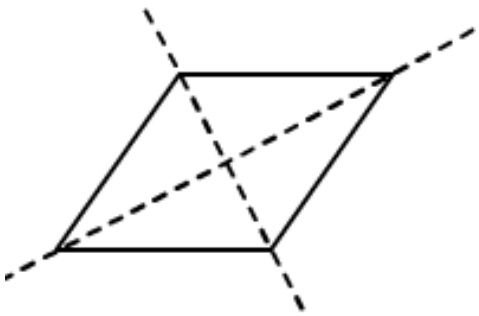
(c) perpendicular bisectors of each of its sides

(d) none of these

Solution:

(a)

Each of its diagonals



Question: 6

The number of lines of symmetry of a rectangle is

(a) 0

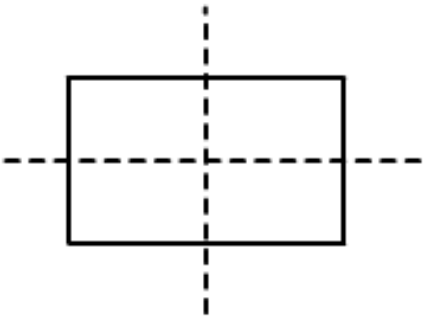
(b) 2

(c) 4

(d) 1

Solution:

(b) 2



Question: 7

The number of lines of symmetry of a kite is

(a) 0

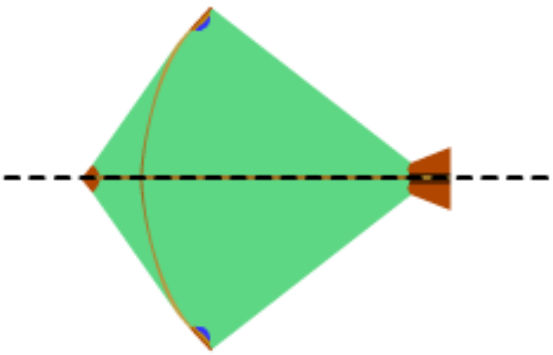
(b) 1

(c) 2

(d) 3

Solution:

(b) 1



Question: 8

The number of lines of symmetry of a circle is

(a) 0

(b) 1

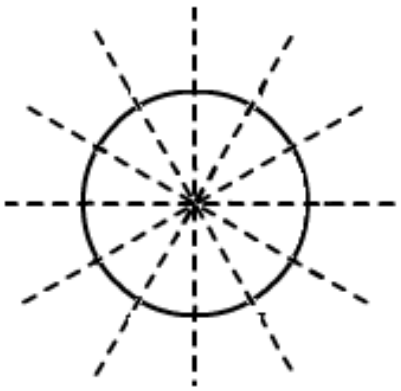
(c) 4

(d) unlimited

Solution:

(d) Unlimited

A circle has an infinite number of symmetry all along the diameters. It has an infinite number of diameters



Question: 9

The number of lines of symmetry of a regular hexagon is

(a) 1

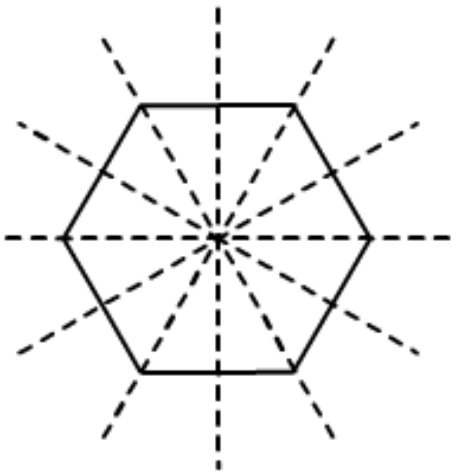
(b) 2

(c) 6

(d) 8

Solution:

(c) 6



Question: 10

The number of lines of symmetry of an n – sided regular polygon is

(a) n

(b) 2n

(c) n/2

(d) none of these

Solution:

(a) n

The number of lines of symmetry of a regular polygon is equal to the sides of the polygon. If it has ‘n’ number of sides, then there are ‘n’ lines of symmetry

Question: 11

The number of lines of symmetry of the letter O of the English alphabet is

(a) 0

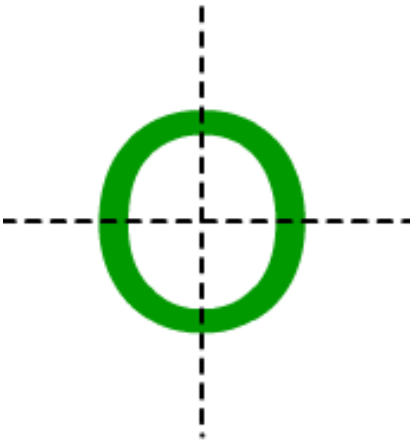
(b) 1

(c) 2

(d) 3

Solution:

(c) 2



Question: 12

The number of lines of symmetry of the letter Z of the English alphabet is

(a) 0

(b) 1

(c) 2

(d) 3

Solution:

(a) 0

Z has no line of symmetry