

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Chapter 07

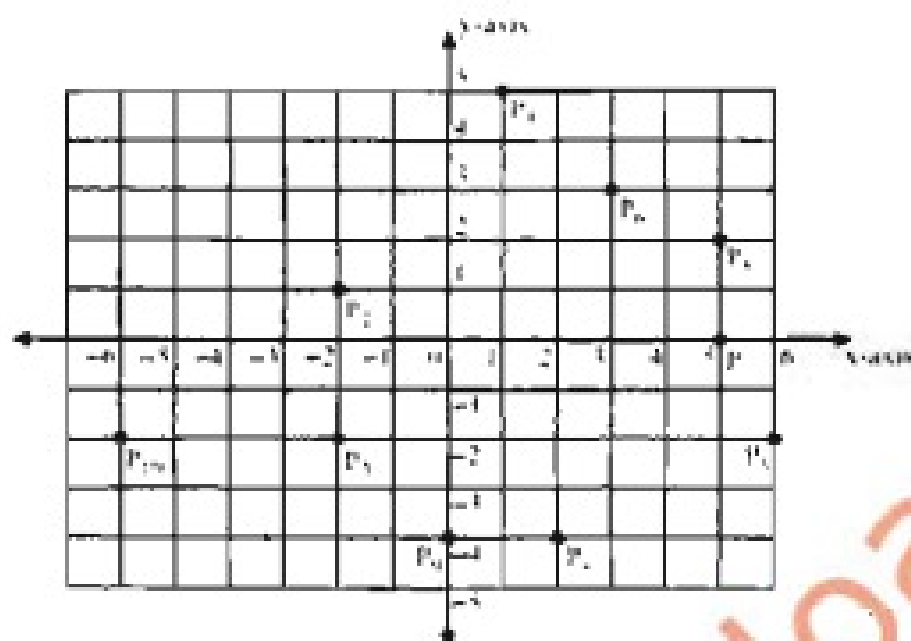
TRANSFORMATIONS

Exercise 7.1

1. Plot each point on a coordinate plane (same graph).

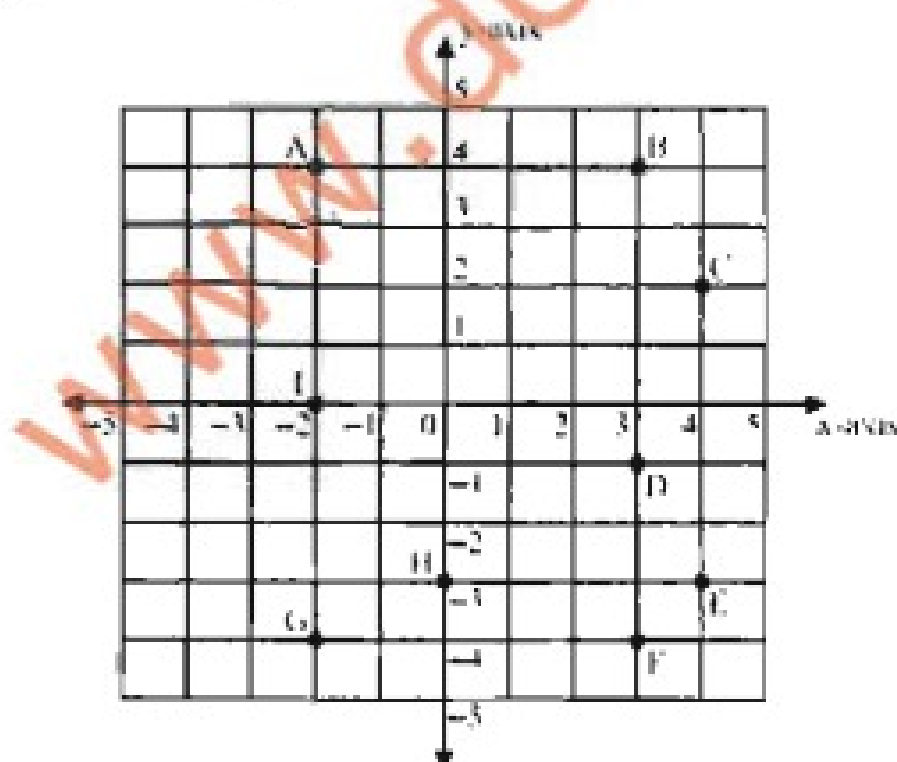
- (i) $P_1 (1, 5)$ (ii) $P_2 (-2, 1)$
 (iii) $P_3 (-2, -2)$ (iv) $P_4 (2, -4)$
 (v) $P_5 (6, -2)$ (vi) $P_6 (3, 3)$
 (vii) $P_7 (5, 0)$ (viii) $P_8 (5, 2)$
 (ix) $P_9 (0, -4)$ (x) $P_{10} (-6, -2)$

Ans.

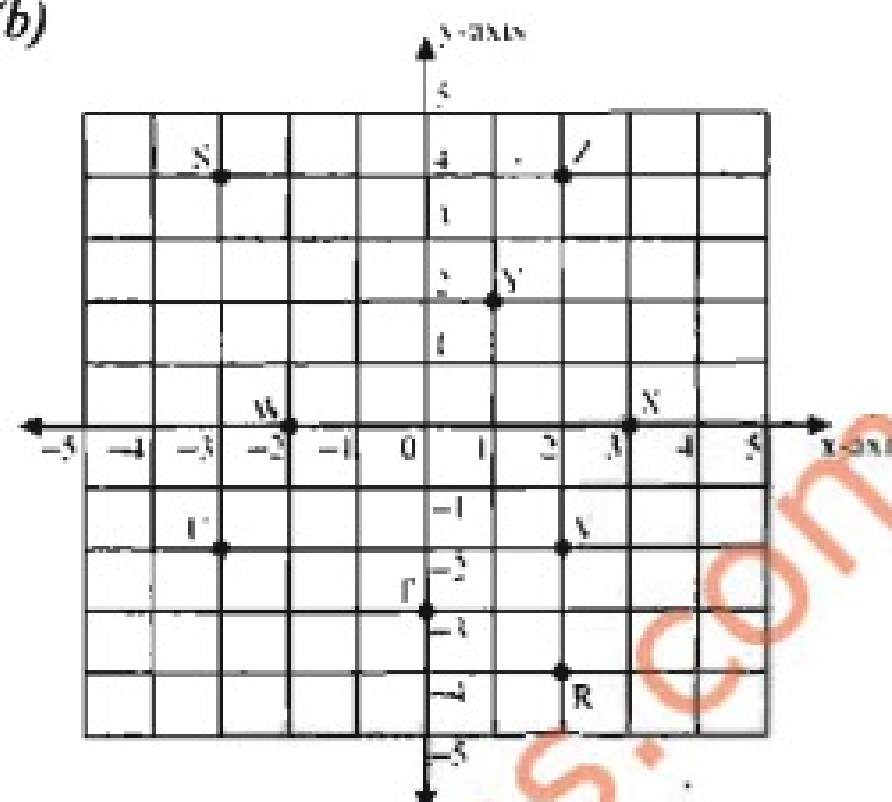


2. Determine the ordered pair (x, y) of the points in the following graphs.

(a)



(b)



- Ans. (a) $(-2, 4)$, $D (3, -1)$, $G (-2, -4)$,
 $B (3, 3)$, $E (4, -3)$, $H (0, -3)$
 $C (4, 2)$, $F (3, -4)$, $I (-2, 0)$
 (b) $R (2, -4)$, $U (-3, -2)$, $X (3, 0)$
 $S (-3, 4)$, $V (2, -2)$, $Y (1, 2)$
 $T (0, -3)$, $W (-2, 0)$, $Z (2, 4)$

3. Without plotting the point, tell whether it is in Quadrant I, II, III, or IV. Give your reasoning.

- (i) $A (2, 4)$

Ans. I quadrant x is +ve and y is +ve.

- (ii) $B (-6, 2)$

Ans. II quadrant x is -ve and y is +ve.

- (iii) $D (-6, -7)$

Ans. III quadrant x is -ve and y is -ve.

- (iv) $F (-4, -5)$

Ans. III quadrant x is -ve and y is -ve.

- (v) $P (1, 3)$

Ans. I quadrant x is +ve and y is +ve.

- (vi) $K (4, -3)$

Ans. IV quadrant x is +ve and y is -ve.

- (vii) $R (0, 7)$

Ans. On y -axis x is zero and y is +ve.

- (viii) $H (6, -2)$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Ans. IV quadrant x is zero and y is +ve.

(ix) $S(-5, 0)$

Ans. On x -axis x is -ve and y is zero.

(x) $T(-3, 5)$

Ans. II quadrant x is -ve and y is +ve.

4. *Answer the following statements.*

(a) *Why do we consider (5, 2) and (2, 5) to be different pairs?*

(b) *Under what circumstances a point is not in any quadrant?*

Ans. (a) Because their corresponding elements are not same.

(b) When one quadrant is O.

5. *The coordinates of the vertices of some geometrical figures are given. Draw and identify the figure by joining these points in each case.*

(a) $(2, 0), (6, 5), (1, 3)$

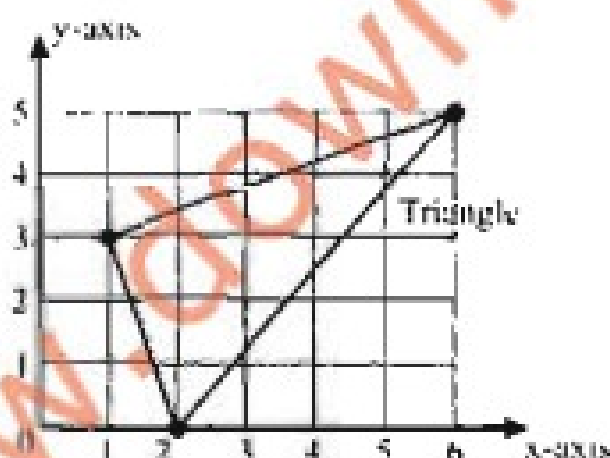
(b) $(-3, -2), (4, -1), (-2, 4)$

(c) $(1, 2), (1, -2), (5, 2), (5, -2)$

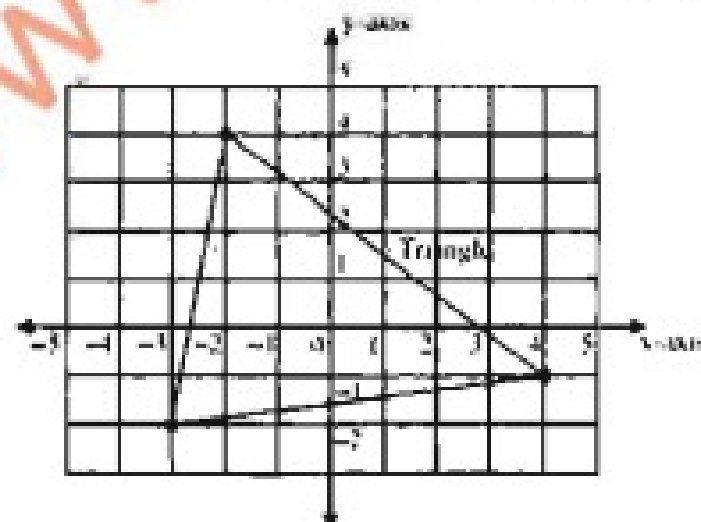
(d) $(-4, 1), (-4, 6), (-1, 1), (-1, 6)$

(e) $(0, -6), (2, -2), (5, -4)$

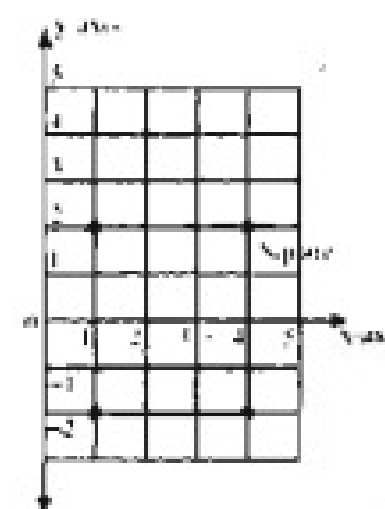
Ans. (a)



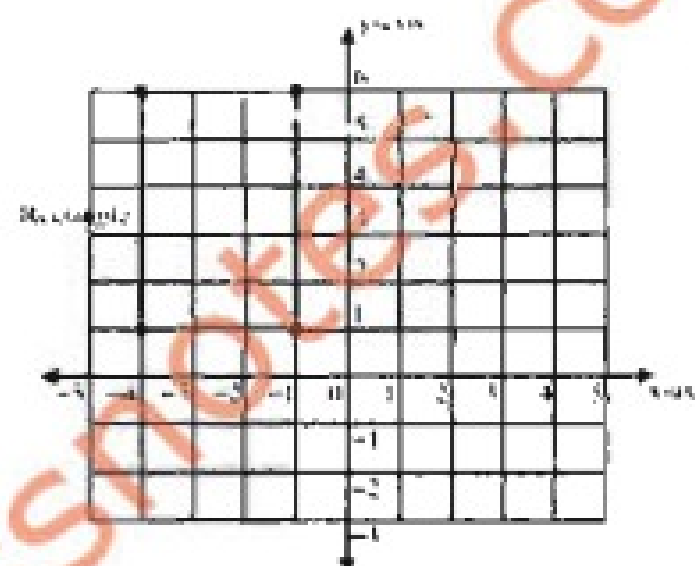
(b)



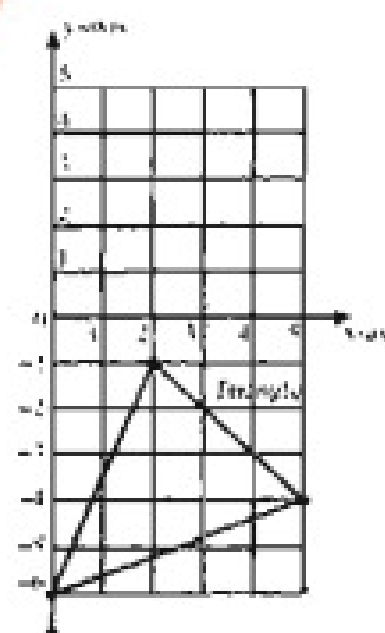
(c)



(d)

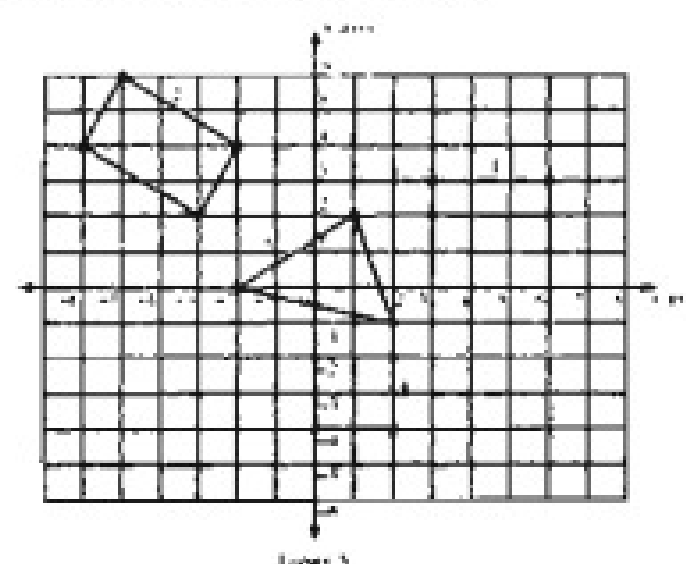


(e)

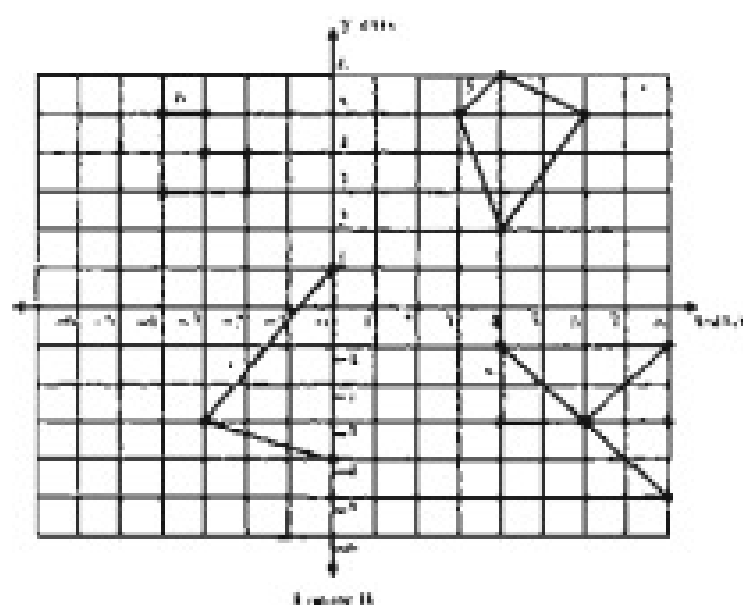


Exercise 7.2

1. *Copy each set of figures on a coordinate plane and answer the following questions.*



MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)



- (i) Write the coordinates of vertices of each figure.
 (ii) Draw the images of each figure under translations.
 (a) 5 units right; 3 units up.
 (b) 2 units left; 4 units down.

Ans. Figure A₁

- (i) (4, 0), (5, 0), (6, 2), (6, 3), (3, 3), (3, 2), (4, 2)
 (ii)(a) (9, 3), (10, 3), (11, 5), (11, 6), (8, 6), (8, 5), (9, 5)
 (b) (2, -4), (3, -4), (4, -2), (4, -1), (1, -1), (1, -2), (2, -2)

Figure A₂

- (i) (-3, 2), (-2, 4), (-5, 6), (-6, 4)
 (ii)(a) (2, 5), (3, 7), (2, 9), (0, 7)
 (b) (-5, 6), (-4, 0), (-5, 2), (-7, 0)

Figure A₃

- (i) (2, -1), (1, 2), (-2, 0)
 (ii)(a) (7, 2), (6, 4), (3, 3)
 (b) (0, -5), (4, 0), (1, -1)

Figure A₄

- (i) (2, -2), (0, -2), (0, -4), (2, -4)
 (ii)(a) (7, 1), (5, -1), (7, -1), (5, 1)
 (b) (0, -6), (-2, -6), (3, -5), (5, -5)

Figure B₅

- (i) (3, 5), (4, 6), (6, 5), (4, 2)
 (ii)(a) (8, 8), (9, 9), (11, 8), (9, 5)
 (b) (1, 1), (2, 2), (4, 1), (2, -2)

Figure B₆

- (i) (-4, 3), (-2, 3), (-2, 4), (-3, 4)
 (ii)(a) (1, 6), (3, 6), (3, 7), (2, 7), (2, 8), (1, 8)
 (b) (-6, -1), (-4, -1), (-4, 0), (-5, 0), (-5, 1), (-6, 1)

Figure B₇

- (i) (0, -4), (-3, -3), (0, 1)
 (ii)(a) (5, -1), (2, 0), (5, 4)
 (b) (-2, -8), (-5, -7), (-2, -3)

Figure B₈

- (i) (4, -3), (4, -1), (6, -3), (8, -1), (8, -5)
 (ii)(a) (9, 0), (9, 2), (11, 0), (13, 2), (13, -2)
 (b) (2, -7), (2, -5), (4, -7), (6, 5), (6, -9)
 2. Plot the given points on a coordinate plane under the following translations. (4, -5), (-2, 0), (-6, -1), (0, -4), (-3, 8)

- (a) 3 unit right, 4 units up
 (b) 0 unit right, 4 units down
 (c) 1 unit left, 0 units up
 (d) 5 units left, 3 units down

Ans.

- (a) (7, -1), (1, 4), (-3, 3), (3, 0), (0, 4)
 (b) (4, -9), (-2, -4), (-6, -5), (0, -8), (-3, -12)
 (c) (3, -5), (-3, 0), (-7, 1), (-1, -4), (-4, -8)
 (d) (-1, -8), (-7, -3), (-11, -4), (-5, -7), (-6, -11)

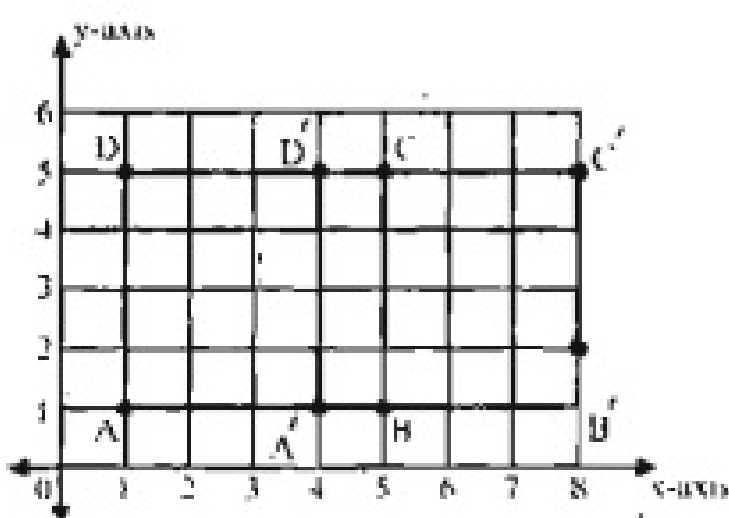
3. On a coordinate plane, graph a rectangle ABCD with vertices:

A (1, 1), B (5, 1), C (5, 5), D (1, 5)

- (a) Translate the rectangle 3 units right and 0 units up.
 (b) Write the vertices of its image.

Ans.(a)

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)



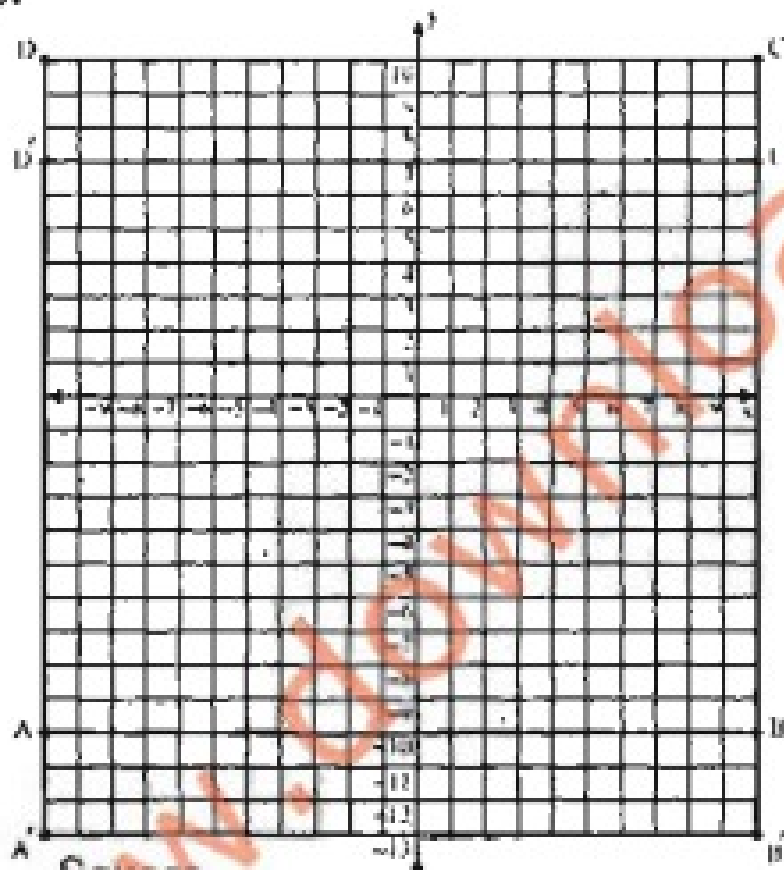
- (b) A (4, 1), B (8, 1), C (8, 5), D (4, 5)

4. Draw the graph of ABCDA by Connecting the following points alphabetically:

A (-10, -10), B (10, -10),
C (10, 10), D (-10, 10)

- (i) Identify the figure.
(ii) Translate the figure 0 unit left and 3 units down.

Ans.



- (i) Square
(ii) On the graph

5. Create a rectangle by connecting points:

A (0, -2), B (2, -2), C (-2, -4)
and D (0, -2)

- (i) Translate the rectangle 0 units right and 5 units up.

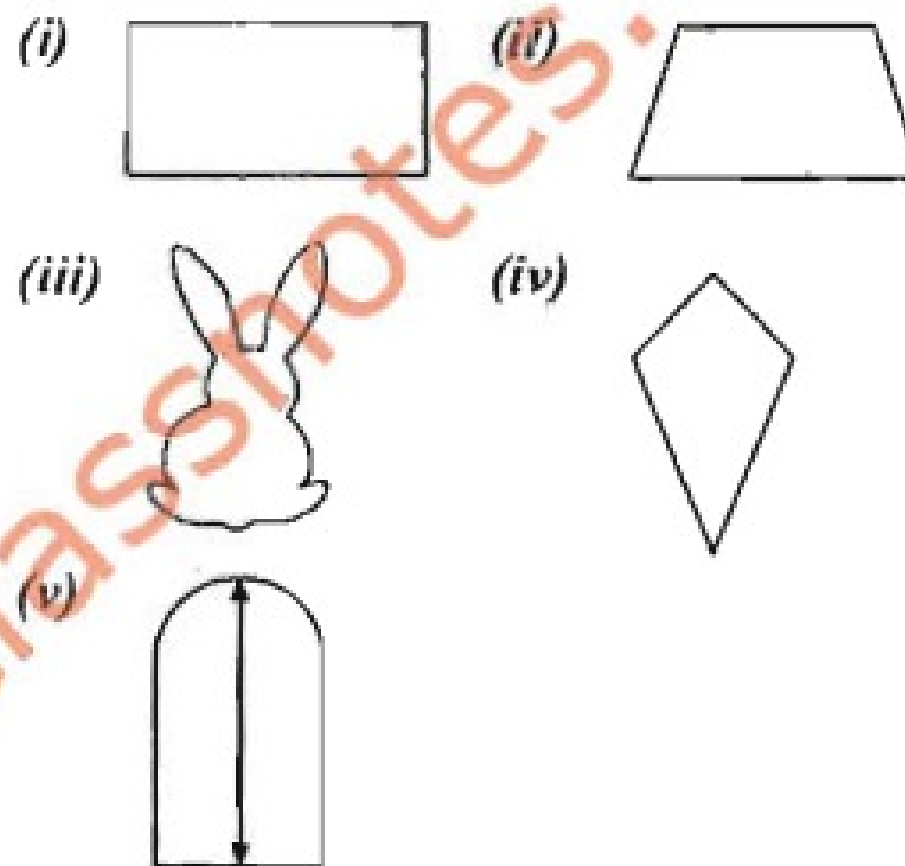
- (ii) Find the area of the rectangle.

Ans.

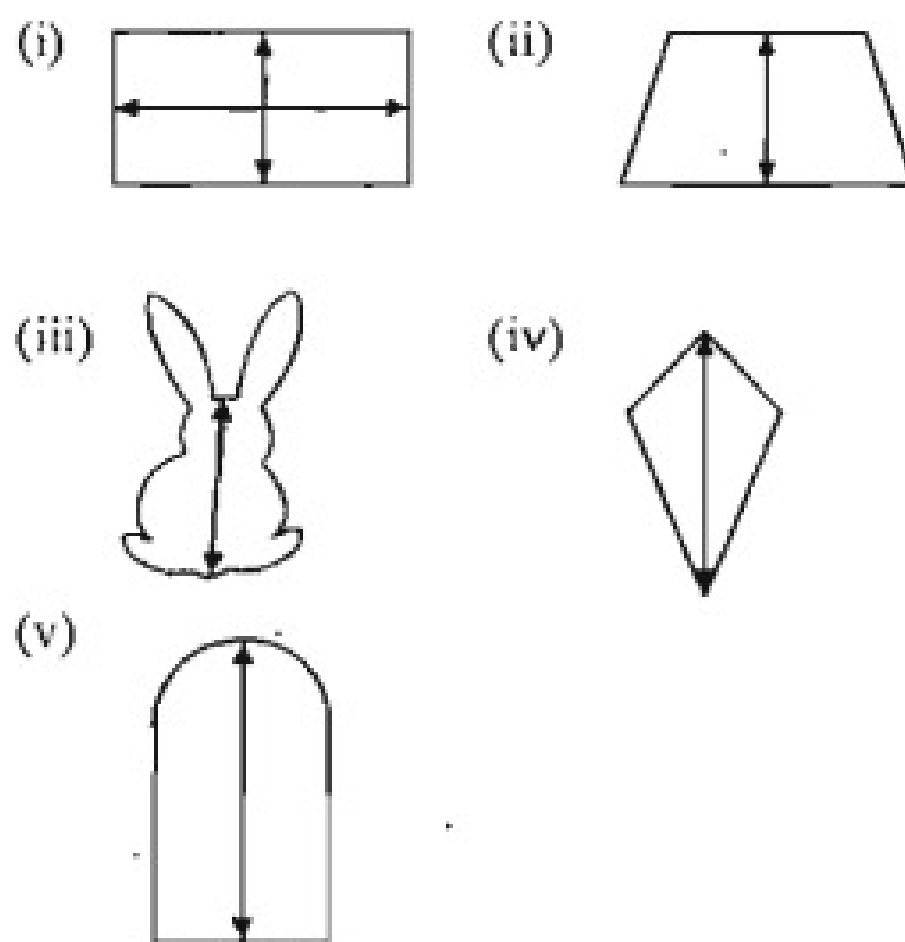
- (i) A' (0, 3), B' (2, 3), C' (-2, 1), D' (0, 3)
(ii) 3

Exercise 7.3

1. Trace the following figures and draw all lines of symmetry.



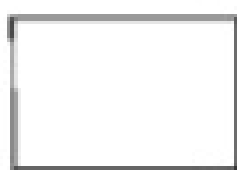
Ans.



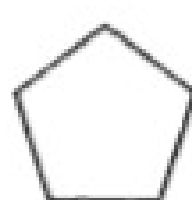
MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

2. Write the order of rotational symmetry of the following figures.

(i)



(ii)



(iii)



(iv)



(v)



Ans.

(i) 4

(ii) 5

(iii) Infinite

(iv) 5

(v) 6

3. For the set of figures given in question 2. Write the measure of angle of rotation.

Ans. (i) Angle of rotation = $\frac{360}{4} = 90^\circ$

(ii) Angle of rotation = $\frac{360}{5} = 72^\circ$

(iii) Indefinite

(iv) Angle of rotation = $\frac{360}{5} = 72^\circ$

(v) Angle of rotation = $\frac{360}{6} = 60^\circ$

4. An animated movie is made from thousands of still drawing. It takes 24 still drawings to create a one-second motion.

About how many still drawings are needed for a 2 hours animated movie?

Ans. One second motion = 24 drawings

2 hours motion = $2 \times 3600 \times 24$

= 172,800 drawings

5. Sketch a car at the top of a hill, what if you want to make an animation showing the car sliding down the hill. Sketch the series of pictures that you would draw. Is your drawings an example of a translation or rotation?

Ans. The drawings will be translated as the car moves downhill.

Review Exercise 7

I. Tick the correct option.

(i) Location of the point $(-1, 0)$, in the coordinate plane is on:

- ✓(a) x-axis (b) 1st quadrant
(c) 3rd quadrant (d) y-axis

(ii) The point $(-3, -1)$ lies on:

- (a) first quadrant
(b) second quadrant
✓(c) third quadrant
(d) fourth quadrant

(iii) The point $(-x, y)$ lies on _____ if x and y are positive.

- (a) first quadrant
✓(b) second quadrant
(c) third quadrant
(d) fourth quadrant

(iv) All points lying on x-axis have y-coordinate _____ if x and y are positive.

- ✓(a) 0 (b) 1
(c) -1 (d) 2

(v) (x, y) when lies in third quadrant has coordinates:

- (a) $(-x, y)$ ✓(b) $(-x, -y)$
(c) (x, y) (d) $(x, -y)$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

(vi) The coordinates of the point $(-2, -3)$ under a translation 3 units up are:

- (a) $(1, 3)$ (b) $(-2, 6)$
 ✓(c) $(-2, 0)$ (d) $(1, 0)$

(vii) The coordinates of the point $(0, 0)$ when translated 3 units left and 5 units down are:

- ✓(a) $(-3, -5)$ (b) $(-3, +5)$
 (c) $(3, -5)$ (d) $(3, 5)$

(viii) The coordinates of the point (x, y) when translated h units to left and k units up become:

- (a) $(-x + h, y + k)$
 ✓(b) $(x - h, y + k)$
 (c) $(x - h, y - k)$ (d) $(x + h, y - k)$

(ix) The coordinates of the point (x, y) when translated h units to right and k units below become:

- (a) $(-x + h, y + k)$ (b) $(x - h, y + k)$
 (c) $(x - h, y - k)$ ✓(d) $(x + h, y - k)$

(x) The coordinates of the point $(0, y)$ when translated 2 units left and 1 unit up are:

- (a) $(-2, y)$ (b) $(2, y)$
 ✓(c) $(-2, y + 1)$ (d) $(2, y - 1)$

(xi) The coordinates of the point $(x, 0)$ when translated 2 units to left and 1 unit up are:

- (a) $(x + 2, 1)$ (b) $(x - 2, -1)$
 (c) $(x + 2, -1)$ ✓(d) $(x - 2, 1)$

2. Draw the following points and label them. (Graph paper is not required)

- (a) $A (1, 5)$
 (b) $B (4, 2)$
 (c) $C (0, 2)$

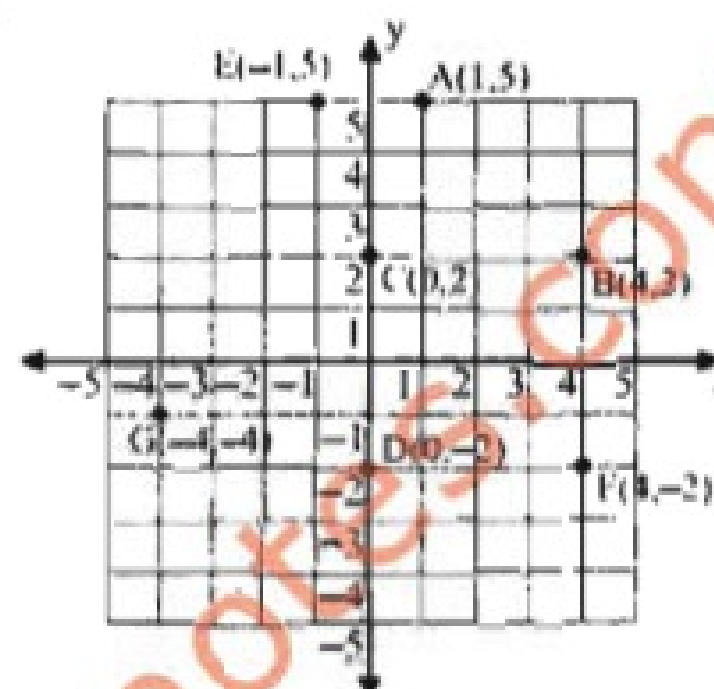
(d) $D (0, -2)$

(e) $E (-1, 5)$

(f) $F (4, -2)$

(g) $G (-1, -5)$

Ans.

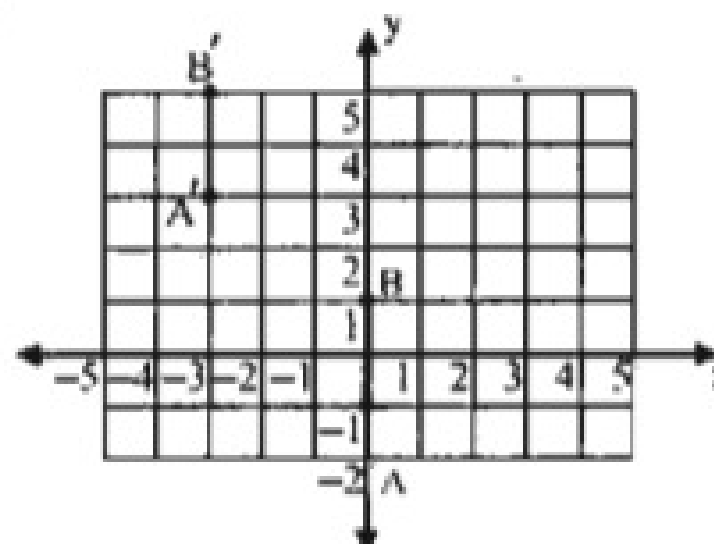


3. For the set of points given in question 2 draw figures BCDB, ACBA, ABEFGA.

Ans.

4. Draw a line segment connecting $A (0, -1)$ and $B (0, 1)$ and translate it 3 units left and 4 units up.

Ans.



5. Write coordinates of points (x, y) under the following translations:

- (a) 0 unit right; 1 unit down
 (b) 1 unit left; 0 unit up
 (c) h unit right; k unit down

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

(d) h unite left; k unit down

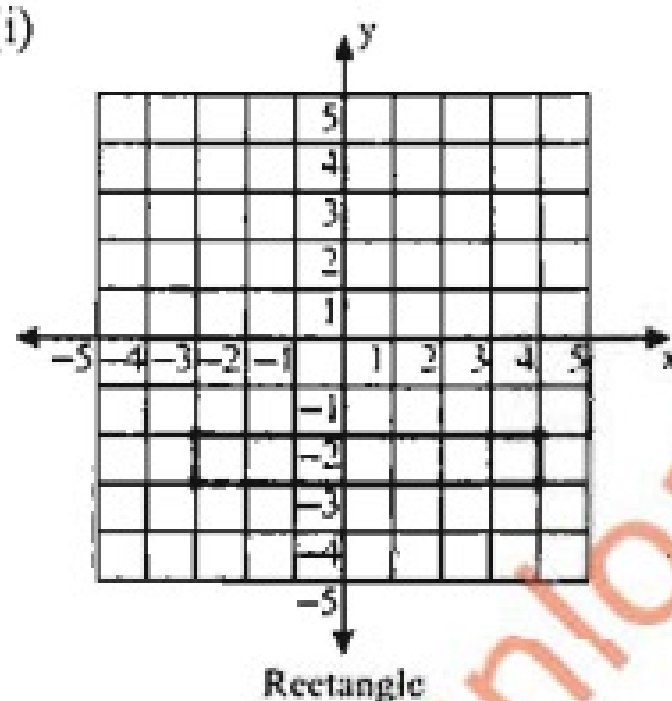
Ans.

- (a) $(x, y - 1)$
- (b) $(x - 1, y)$
- (c) $(x + h, y + k)$
- (d) $(x - h, y - k)$

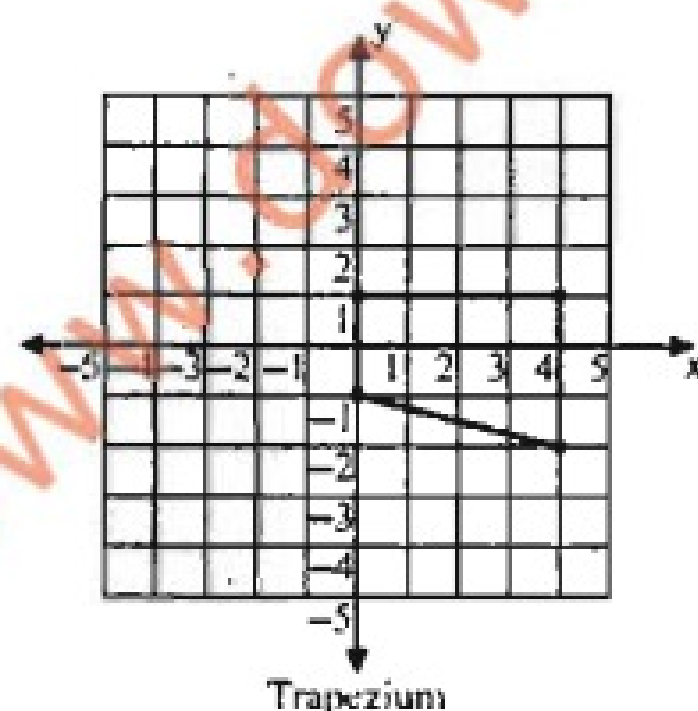
6. Graph the set of points on a single coordinate plane, connect the points in order that they are given. Connect the last point to the first. What figure did you get?

- (i) $(-3, -2), (-3, 3), (4, 3), (4, -2)$
- (ii) $(4, -1), (4, 1), (0, -1), (4, -2)$
- (iii) $(0, 6), (4, 3), (0, 1)$

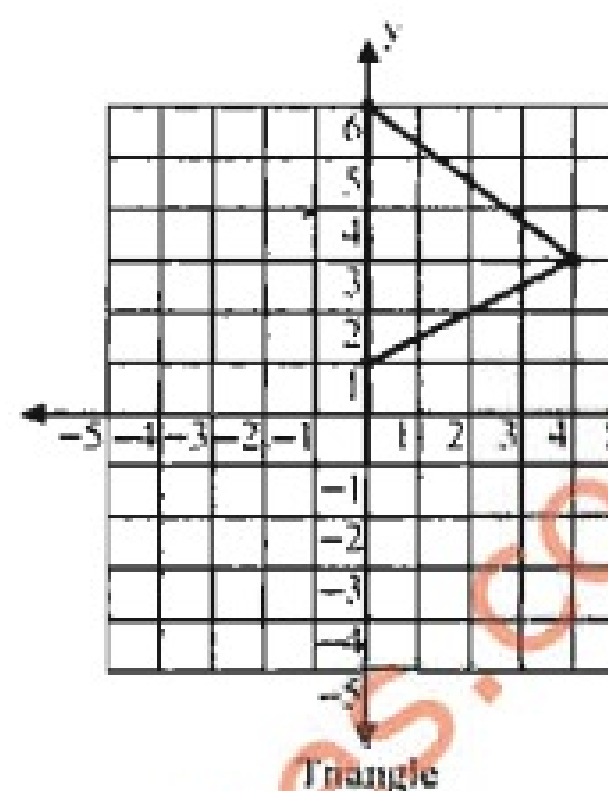
Ans. (i)



(ii)



(iii)



7. Suppose you are drawing a map on a coordinate grid. Your school is 3 units left and 4 units up from origin. What are the coordinates of your school?

Ans. $(-3, 4)$

8. On a map drawn on coordinate grid, Ahmad's house is 2 units right and 5 units up and his school is 3 units left and 7 units down. What are the coordinates of his school and house?

Ans. School $(2, 5)$

House $(-3, -7)$

9. The first coordinate of each vertex of square is positive. The second coordinate of each is negative. In which quadrant does the square lie?

Ans. Fourth quadrant

10. Find the coordinates of a point 2 units to the right of $(-4, 2)$.

Ans. $x = (-4 + 2, 2)$

$y = (-2, 2)$