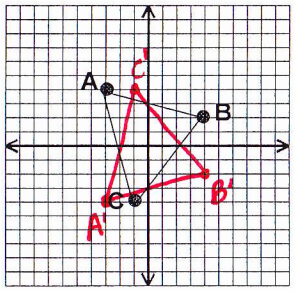
Ch 12: Transformations

REFLECTIONS

y-axis
$(x, y) \rightarrow (-x, y)$

EXAMPLE 1 Reflect Δ ABC across the x-axis and name the coordinates.



A(-3 , 4) → A'(-3 , -4)

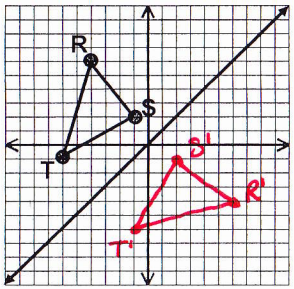
B(4 , 2) → B'(4 , -2)

C(-1 , -4) → C'(-1 , 4)

Do you see a pattern?

$(x, y) \rightarrow (x, -y)$

EXAMPLE 2 Reflect ΔRST across the line y = x and name the coordinates.



R(-4 , 6) → R'(6 , -4)

S(-1 , 2) → S'(2 , -1)

T(-6 , -1) → T'(-1 , -6)

Do you see a pattern?

$(x, y) \rightarrow (y, x)$

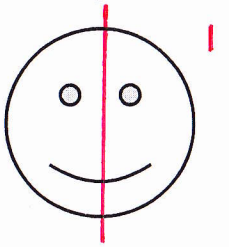
LINES OF SYMMETRY

EXAMPLE 3 What, if any, were the lines of symmetry in EXAMPLES 1& 2?

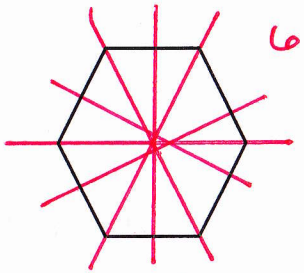
a) EXAMPLE 1- x-axis
b) EXAMPLE 2- y = x

EXAMPLE 4 Draw the line(s) of symmetry, if any, for the following figures.

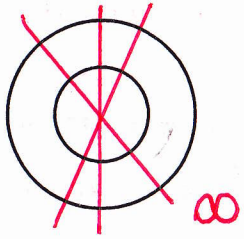
a) 1



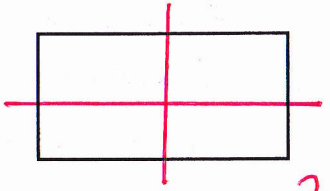
b) 6



c) ∞

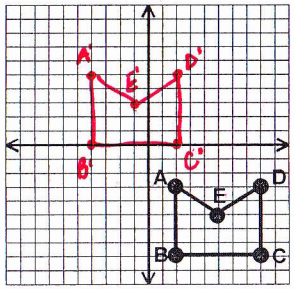


d) 2



TRANSLATIONS

EXAMPLE 5 Translate the figure left 6 and up 8. Give the coordinates of the new points.



A'(-4 , 5)

B'(-4 , 0)

C'(2 , 0)

D'(2 , 5)

E'(-1 , 3)

ROTATIONS

Two types:

Clockwise

Counter-clockwise

Determined by degrees:

90°: $\frac{1}{4}$ turn (same as 270° in opposite direction)

180°: $\frac{1}{2}$ turn (same in both directions)

270°: $\frac{3}{4}$ turn (same as 90° in opposite direction)

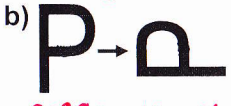
360°: 1 turn (back to where you began)

EXAMPLE 6 Describe each rotation.

a) 90° Clockwise

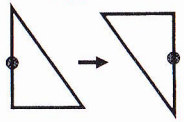
270° Counter-clockwise

b) 270° Clockwise



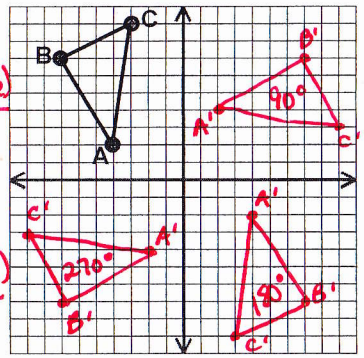
90° Counter-clockwise

c) 180°



EXAMPLE 7 Draw the resulting triangles when the triangle is rotated 90°, 180°, and 270° clockwise.

90° Clockwise
(270° Counter-clockwise)
$(x,y) \rightarrow (y,-x)$



180°
$(x,y) \rightarrow (-x,-y)$

270° Clockwise
(90° Counter-clockwise)
$(x,y) \rightarrow (-y,x)$

A(-4,2)
B(-7,7)
C(-3,9)

DILATIONS WITH SLOPE

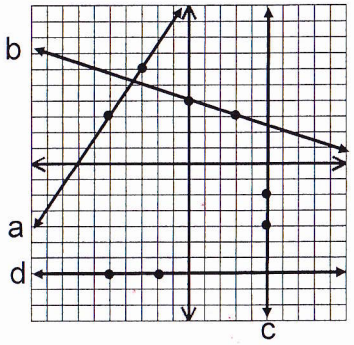
EXAMPLE 8 Use the graph below to find the following slopes.

a) slope of line a: $\frac{3}{2}$

b) slope of line b: $-\frac{1}{3}$

c) slope of line c: Und

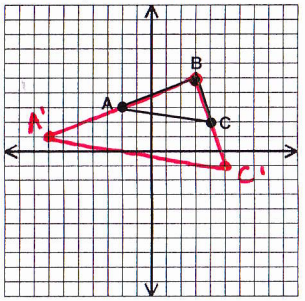
d) slope of line d: 0



Slope can be useful in dilating images.

EXAMPLE 9

Use "slope" to produce a dilation of ΔABC with a scale factor of 2. Use "B" as your center.

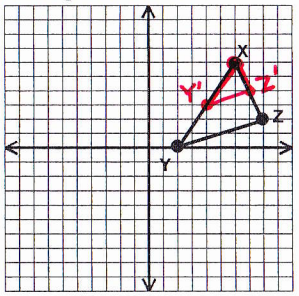


A' (-7 , 1)

C' (5 , -1)

EXAMPLE 10

Use "slope" to produce a dilation of ΔXYZ with a scale factor of ½. Use X as your center.



Y' (4 , 3)

Z' (7 , 4)