

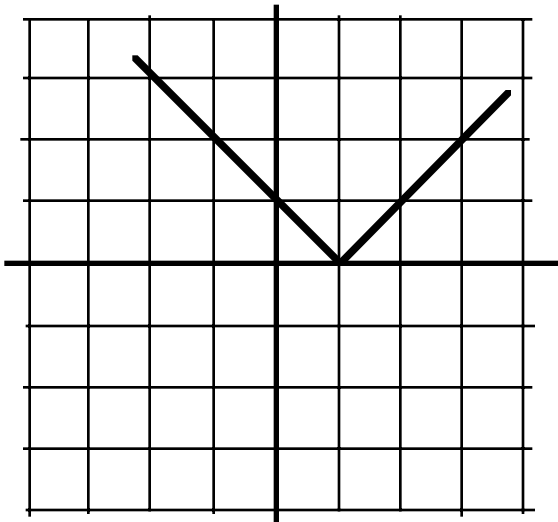
Reflections 20

Relations can be **reflected** about the y-axis or the x-axis.

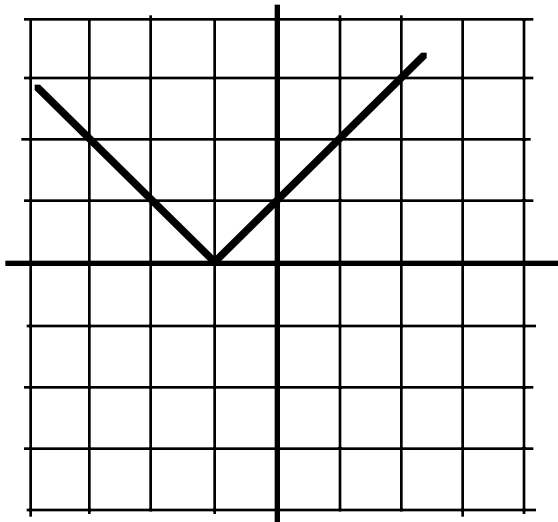
In a reflection about the y-axis, we replace x with $-x$. Each point (x, y) of the relation is replaced by $(-x, y)$.

e.g.

$$y = |x - 1|$$



$$y = |-x - 1|$$

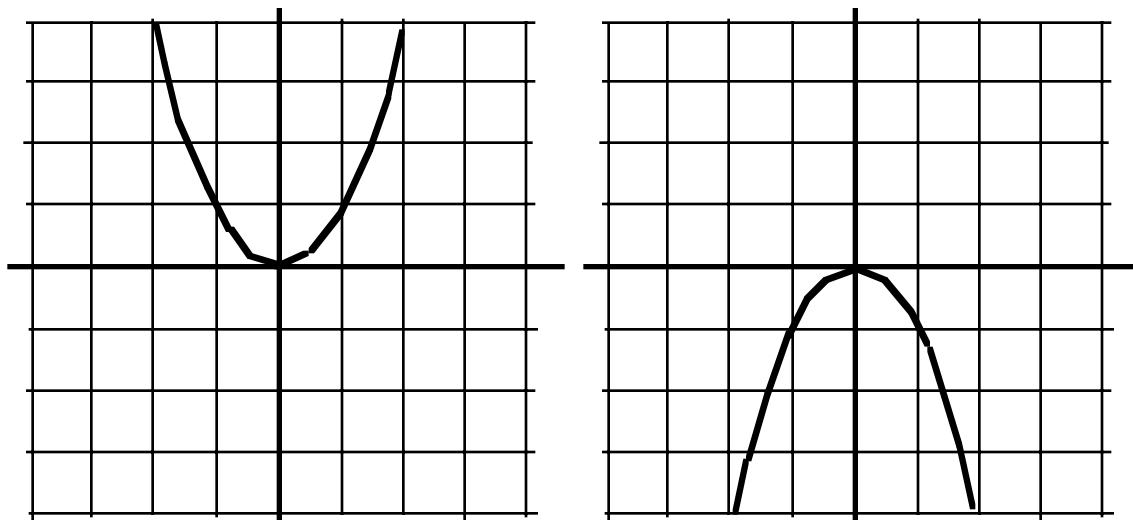


In a reflection about the x-axis, we replace y by $-y$. Each point (x, y) of the relation is replaced by $(x, -y)$.

e.g.

$$y = x^2$$

$$-y = x^2$$



Problems:

1) Find the relation which is the reflection about the y-axis for each of the following relations.

a) $(3, -4)$

b) $\{ (1, 1); (2, 2); (3, 3) \}$

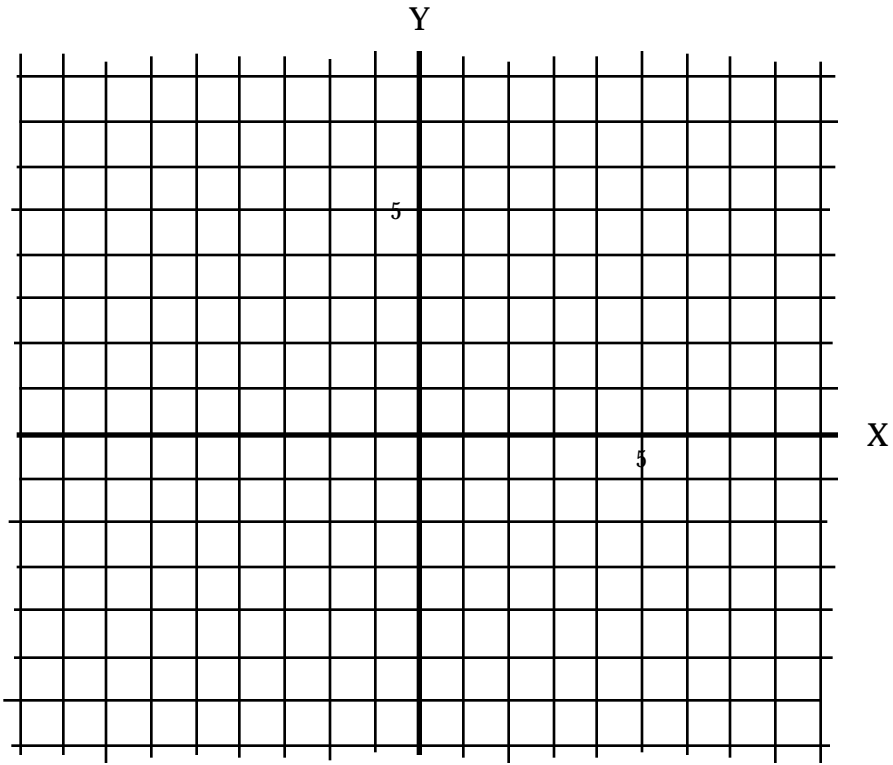
c) $x = y^2$

d) $y = -3x + 5$

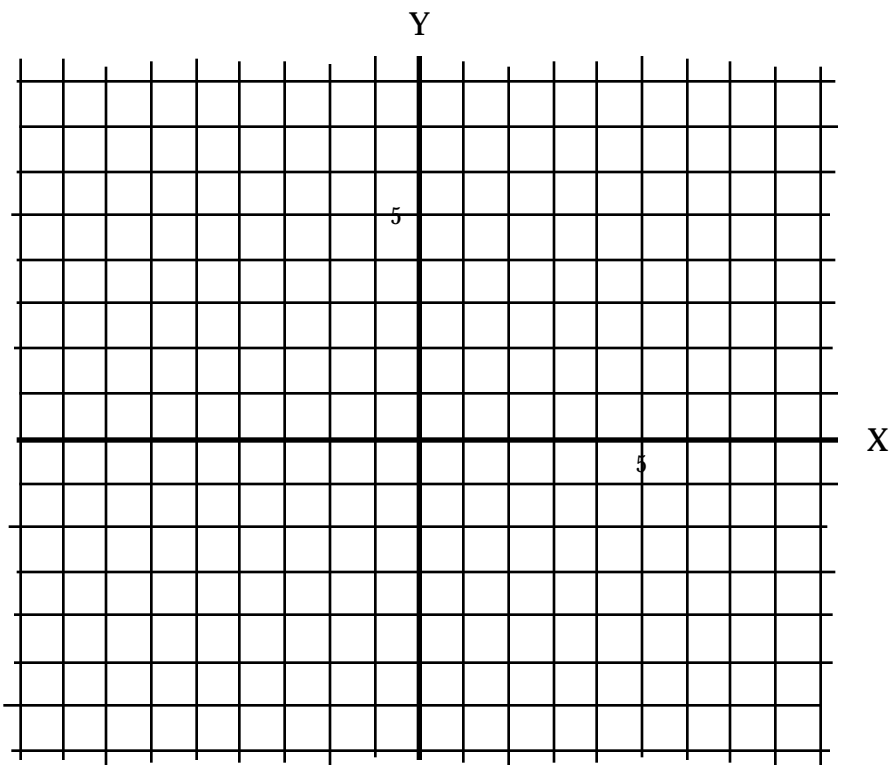
2) Find the reflections about the x-axis for the relations given in problem 1).

3) Give the equation for the following relation when it is reflected about the y-axis and sketch the relation.

a) $y = \sqrt{x}$

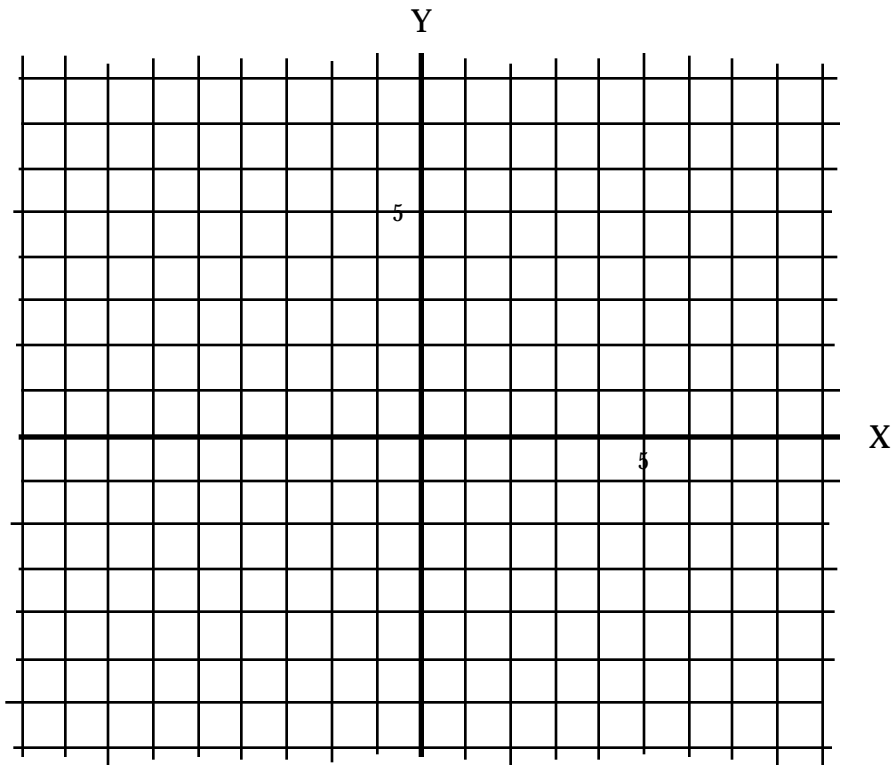


b) $y = |x + 2|$

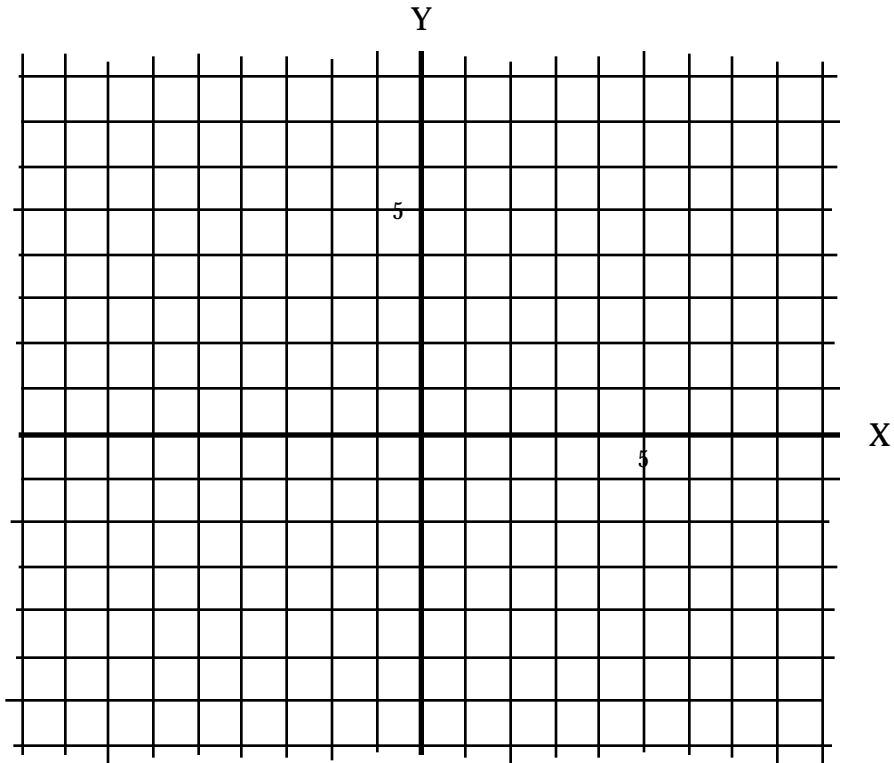


4) Give the equation for the following relation when it is reflected about the x-axis and sketch the relation.

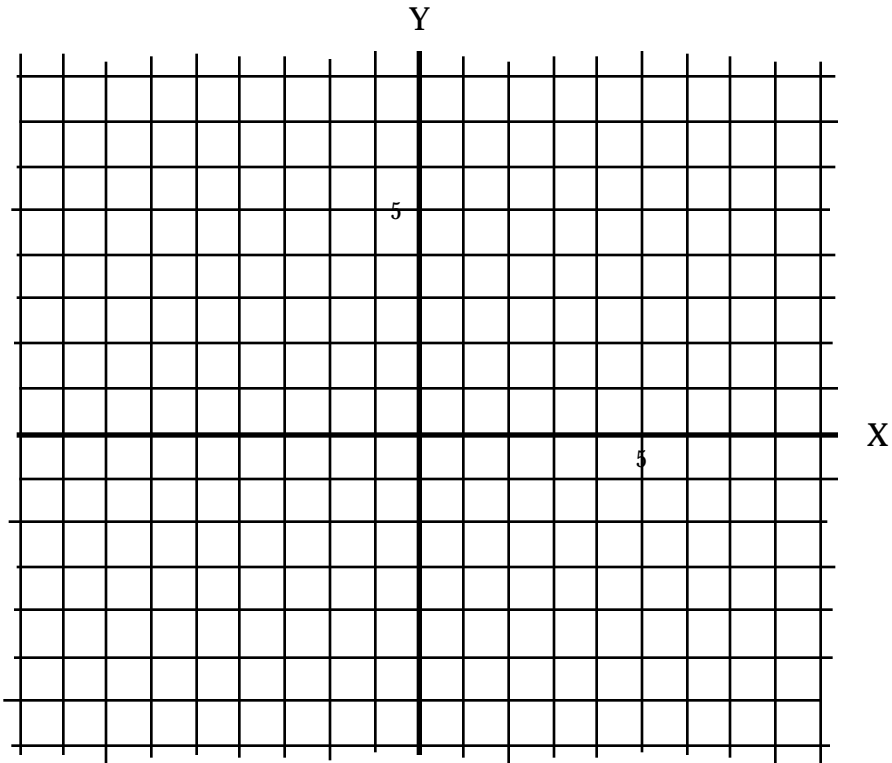
a) $y = \sqrt{x}$



b) $y = |x + 2|$

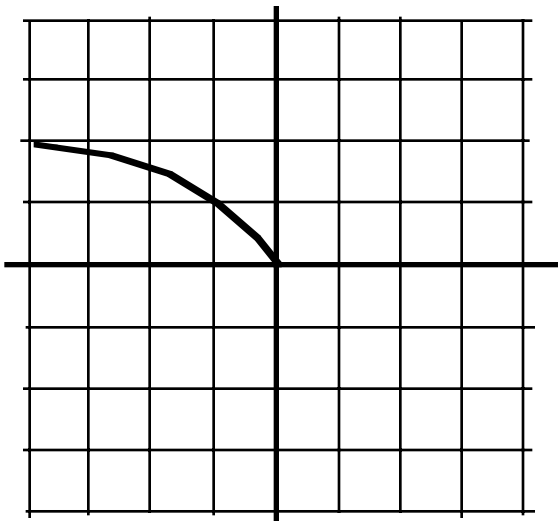


- 5)a) Graph the equation: $y + 2 = (x - 4)^2$
- b) Give the equation for the reflection about the y-axis and graph.
- c) Give the equation for the reflection about the x-axis and graph.
- d) Give the equation for the reflection about the x-axis **and** the y-axis. Graph the relation.

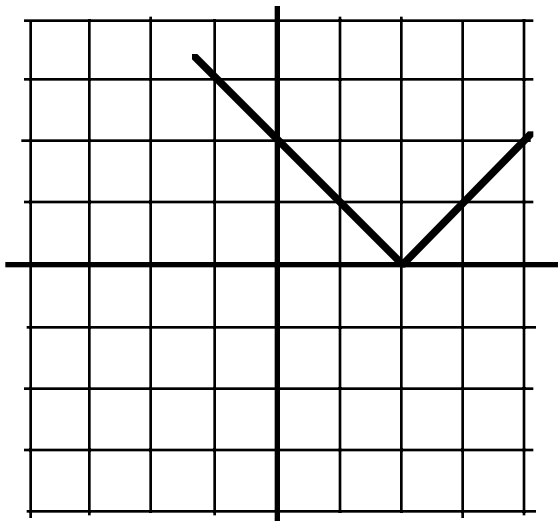


Answers: 1)a) (-3, -4), b) (-1, 1), (-2, 2), (-3, 3), c) $-x = y^2$, d) $y = 3x + 5$, 2)a) (3, 4), b) (1, -1), (2, -2), (3, -3), c) $x = y^2$, d) $y = 3x - 5$, 3)a), b)

$$y = \sqrt{-x}$$

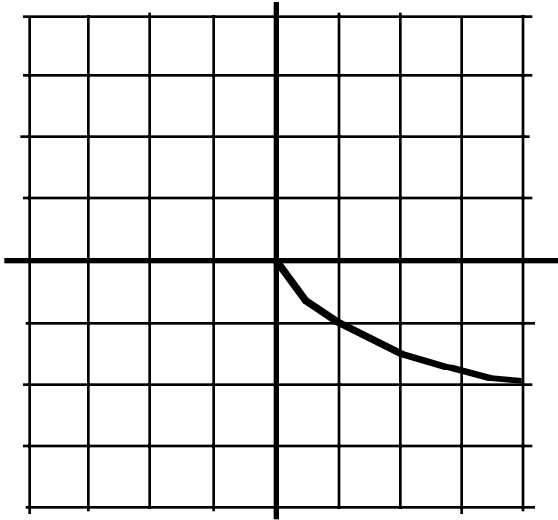


$$y = |-x + 2|$$

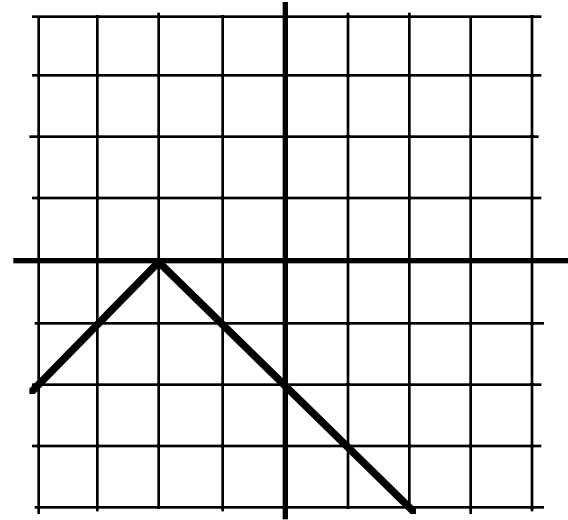


4)a), b)

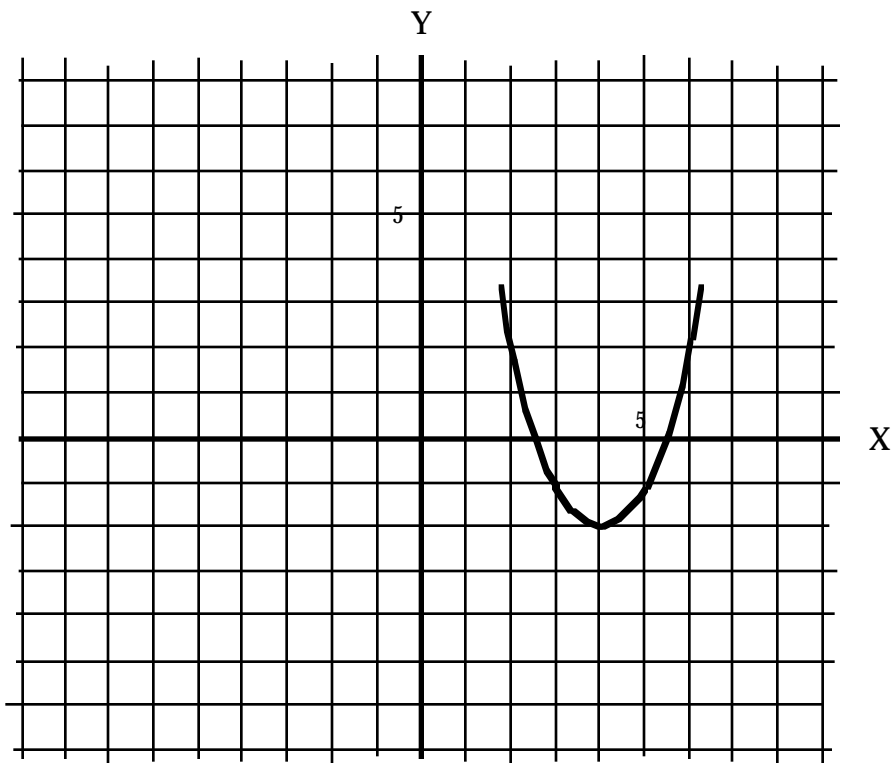
$$-y = \sqrt{x}$$



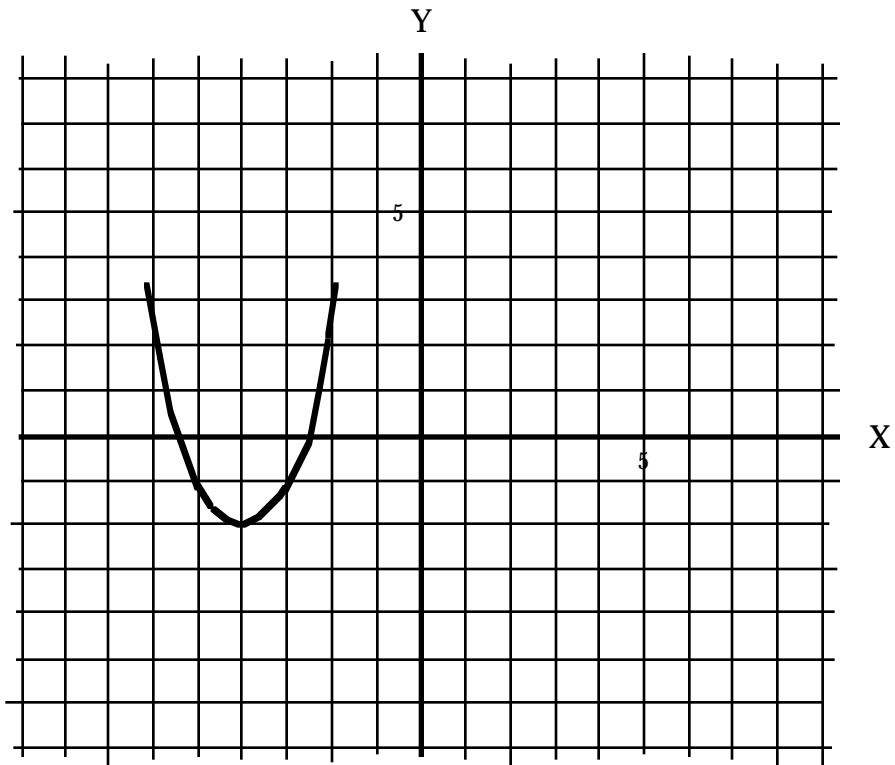
$$-y = |x + 2|$$



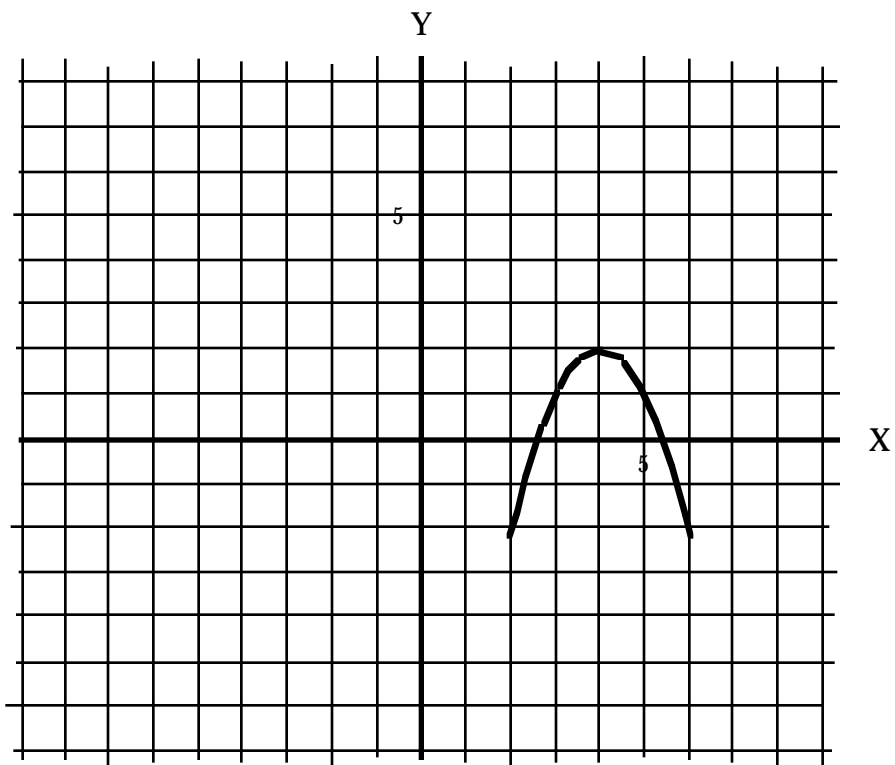
5)a)



$$b) y + 2 = (-x - 4)^2 = (x + 4)^2$$



c) $y - 2 = -(x - 4)^2$



d) $y - 2 = - (x + 4)^2$

