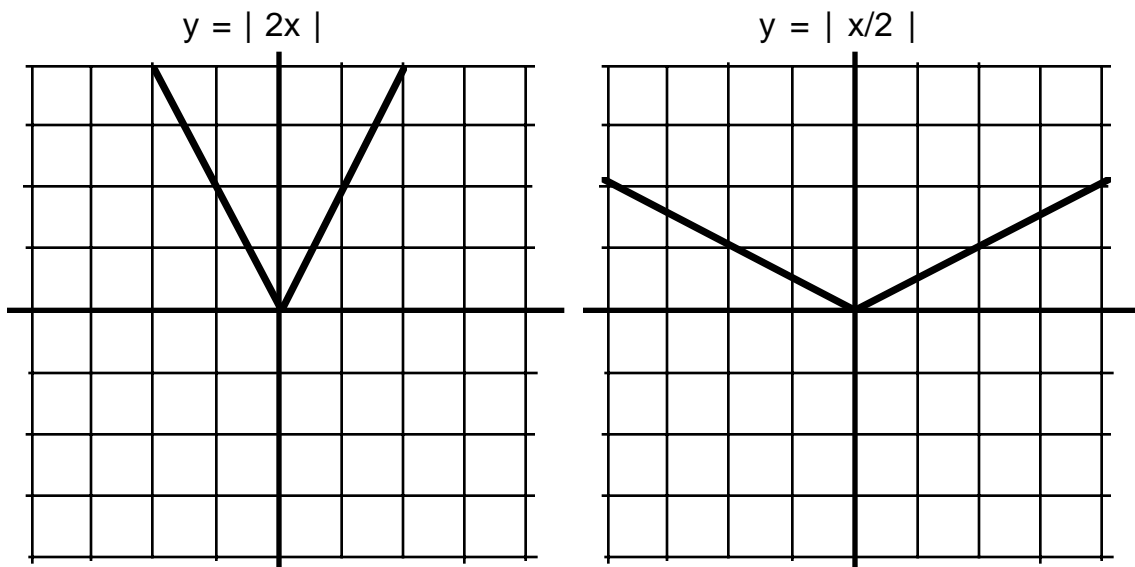


Dilations - 40

A dilation is a change which will stretch or shrink a graph.

We can shrink a graph in the x-direction by a factor of 2, if we replace x by $2x$. We can stretch a graph in the x-direction by replacing x by $x/2$.

e.g. Compare the following graphs with the graph of $y = |x|$.

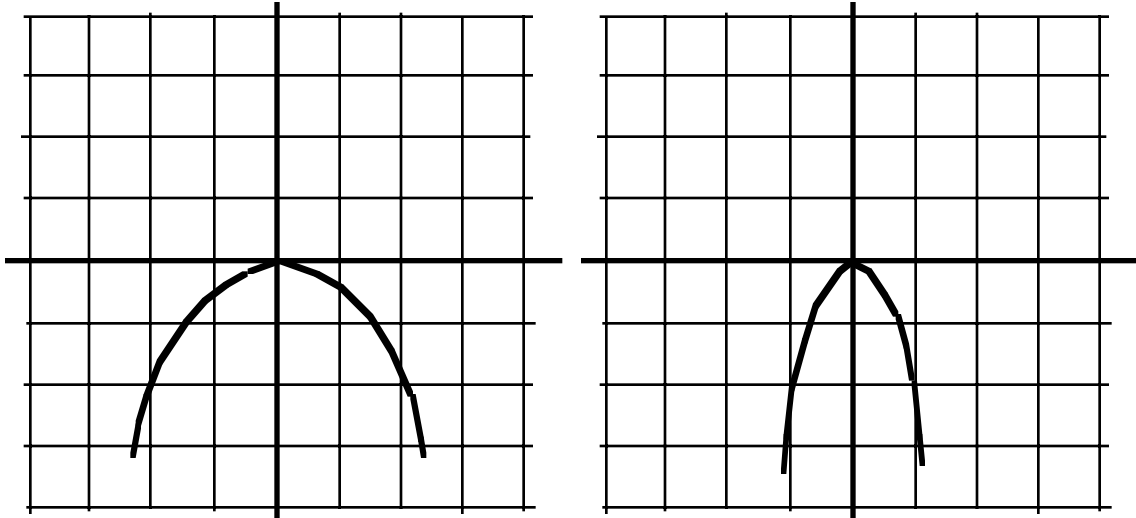


We can shrink a graph in the y-direction by a factor of 2, if we replace y by $2y$. We can stretch a graph in the y-direction by replacing y by $y/2$.

e.g. Compare the following graphs with $(y) = -(x)^2$.

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

$$(y/2) = -(x)^2$$



Problems:

1) Given the function; $y = g(x)$, explain how it changes when:

- a) x is replaced by $3x$
- b) y is replaced by $y/4$

2) Given the function; $y = h(x)$, give the new equation after:

- a) It is stretched in the x -direction by a factor of 2.
- b) It is shrunk in the y -direction by a factor of 3.

3) Graph the following equations;

- a) $y = \sqrt{x}$
- b) $y/2 = \sqrt{x}$

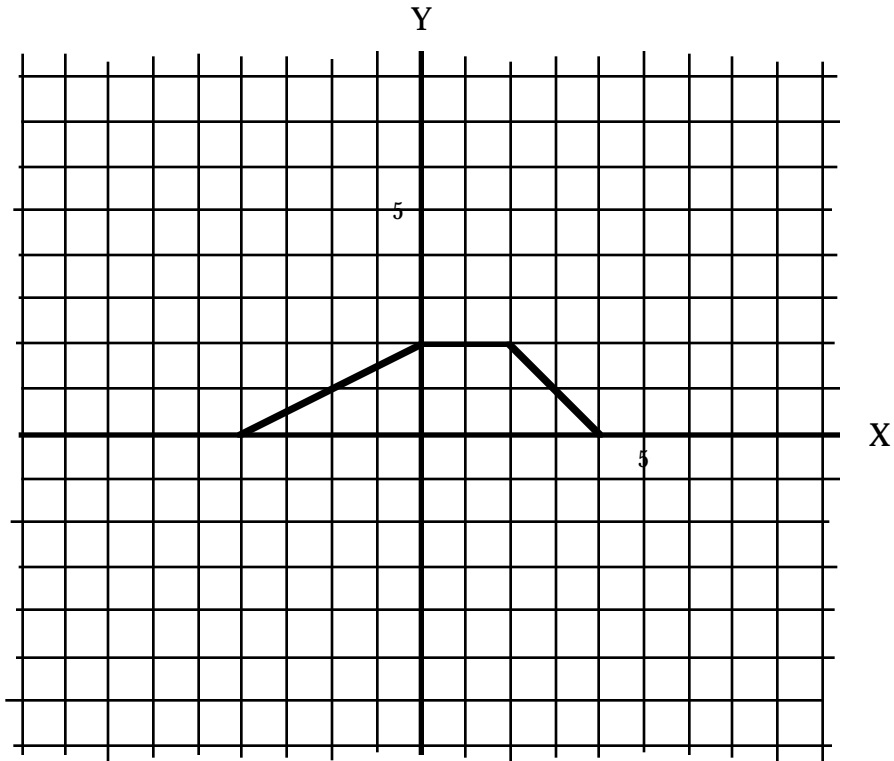
4) Graph the following equations;

- a) $y = 12/x$
- b) $y = 12/(2x)$

5) Graph the following equations;

- a) $y = |x|$
- b) $y = |x/3|$

6) The function $y = f(x)$ is shown below.

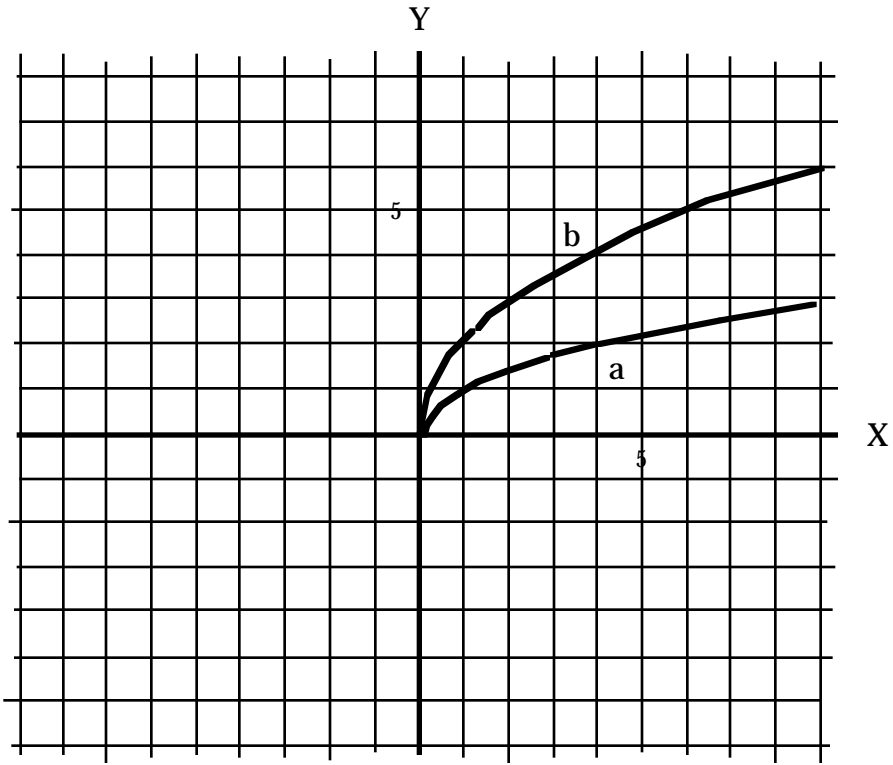


a) Graph $y/3 = f(x)$

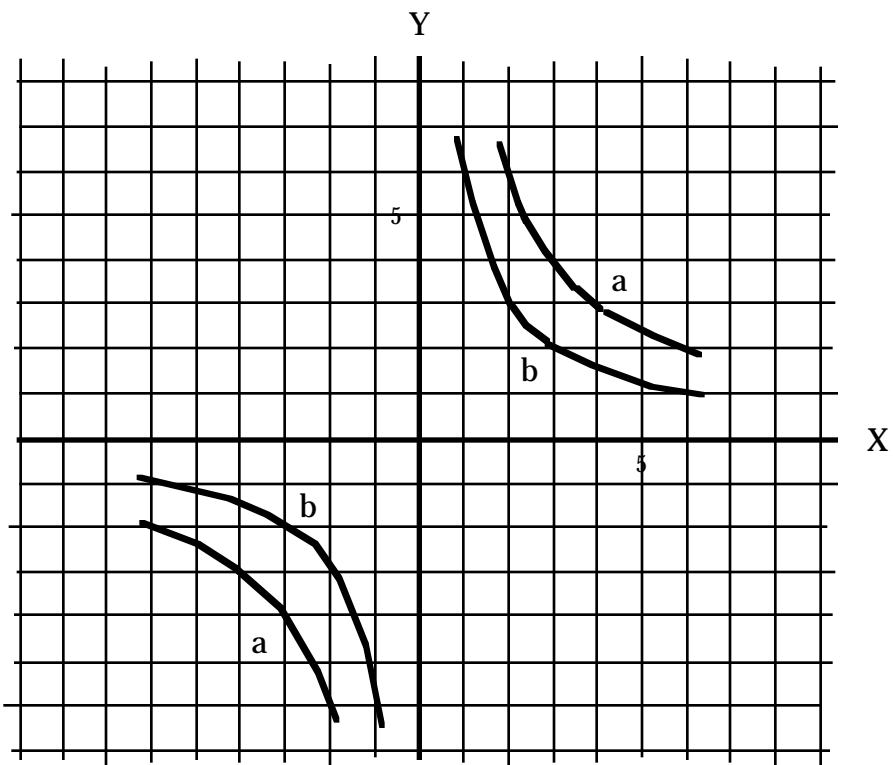
b) Graph $y = f(2x)$

c) Graph $y/3 = f(2x)$

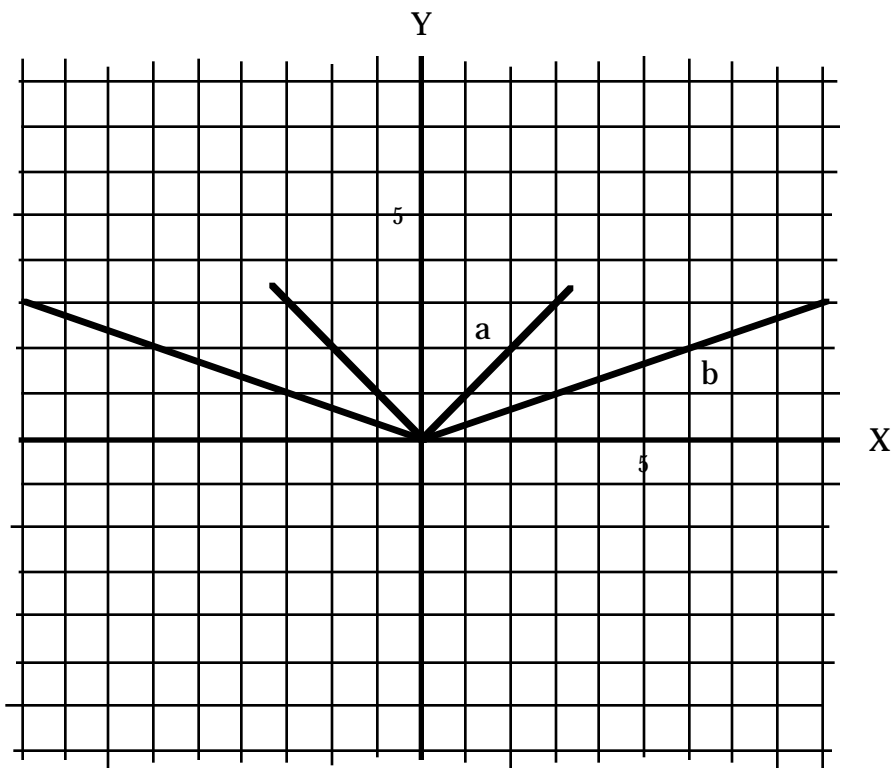
Answers: 1)a) $y = g(x)$ shrinks by a factor of 3 in the x-direction, b) $y = g(x)$ stretches by a factor of 4 in the y-direction, 2)a) $y = h(x/2)$, b) $3y = h(x)$, 3)a), b)



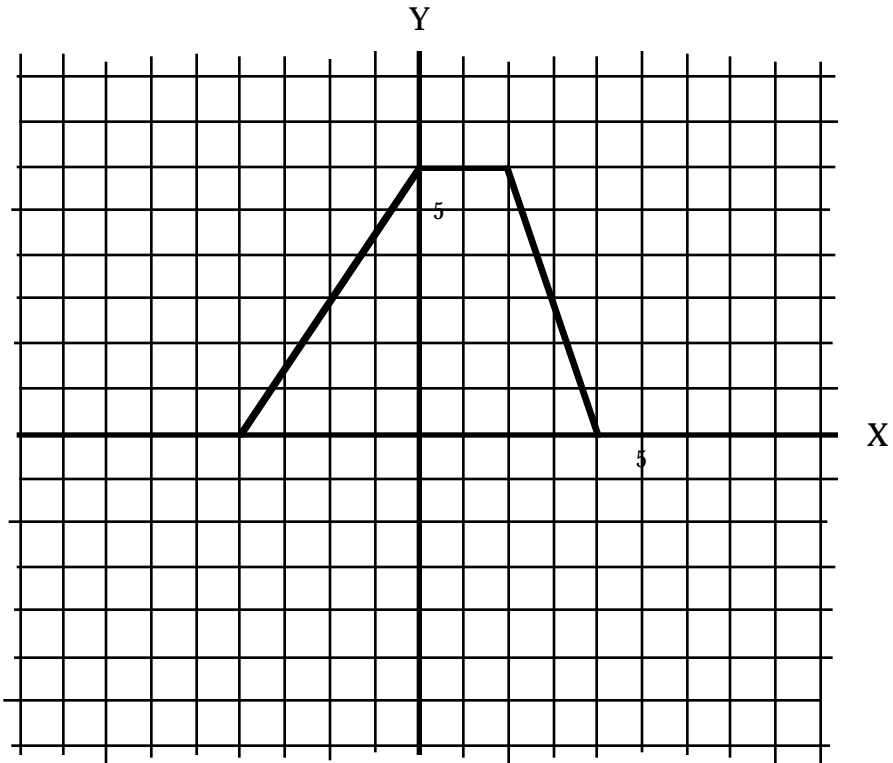
4)a), b)



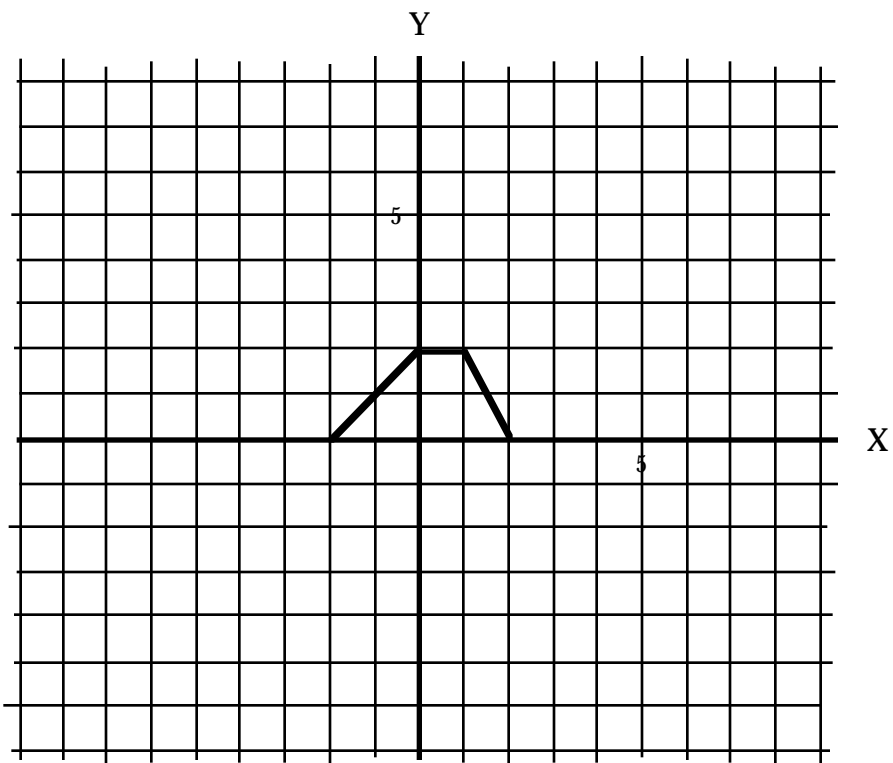
5)a), b)



6)a)



6)b)



6)c)

