

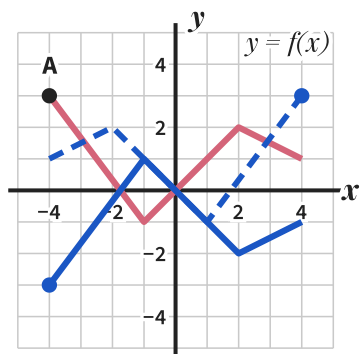
# Graph Transformations: Reflections *stretch*

ANSWERS

1



Sketch  $y = -f(x)$  and  $y = f(-x)$  on the same grid. Label each one and write down where A goes on each.



Answer  $A$  goes to  $(-4, -3)$  and  $(4, 3)$

2



$f(x) = 2x + 3$ . Write the equations of  $y = -f(x)$  and  $y = f(-x)$ . Which one crosses the  $y$  axis in the same place as  $y = f(x)$ ?

$$-(2x + 3) = -2x - 3$$

$$f(-x): 2(-x) + 3, \text{ still } (0, 3)$$

Answer  $y = -2x - 3; y = -2x + 3$

3



$f(x) = x^2 + 2x - 8$ . Solve  $f(x) = 0$ , then write down where  $y = f(-x)$  crosses the  $x$  axis.

$$(x + 4)(x - 2) = 0: x = -4 \text{ or } 2$$

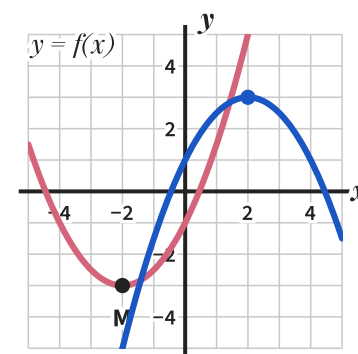
$x$  changes sign

Answer  $(-2, 0)$  and  $(4, 0)$

4



$M(-2, -3)$  is the minimum of  $y = f(x)$ . Find the turning point of  $y = -f(-x)$ . Maximum or minimum?



Answer Maximum  $(2, 3)$

5



Noise cancelling headphones hear a sound wave  $y = f(t)$  and play the wave  $y = -f(t)$ . At  $t = 3$  the sound wave is at 0.6.

Where is the played wave at  $t = 3$ ? Describe the transformation, and explain why you hear nothing.

$$0.6 + (-0.6) = 0$$

the waves add to 0 at every time

Answer  $-0.6$ ; a reflection in the  $t$  axis

6



The graph of  $y = f(-x)$  passes through  $(3, -2)$  and  $(-1, 4)$ . Write down two points on the graph of  $y = f(x)$ .

reflect back in the  $y$  axis

the  $x$  coordinates change sign

Answer  $(-3, -2)$  and  $(1, 4)$

7



Ravi reflects  $y = x^2 - 4x$  in the  $x$  axis. He writes  $y = -x^2 - 4x$ . Explain his mistake and write the right equation.

every term changes sign:  $-(x^2 - 4x)$

he left  $-4x$  as it was

Answer  $y = -x^2 + 4x$

8



$f(x) = x^2 + 3$ . Explain why the graph of  $y = f(-x)$  is exactly the same as the graph of  $y = f(x)$ .

$$f(-x) = (-x)^2 + 3 = x^2 + 3$$

the reflection lands on itself

Reason Symmetrical about the  $y$  axis