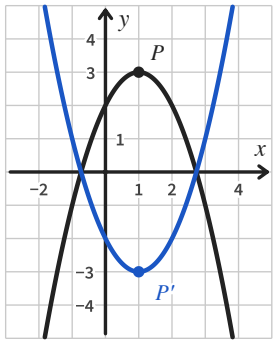
Graph transformations: reflections

ANSWERS

1

The graph of $y = f(x)$ is drawn. P is on it.
Sketch $y = -f(x)$.

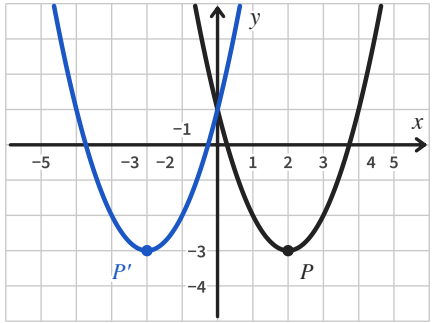


Reflection in the x axis

P goes to (1, −3)

2

The graph of $y = f(x)$ is drawn. P is on it.
Sketch $y = f(-x)$.

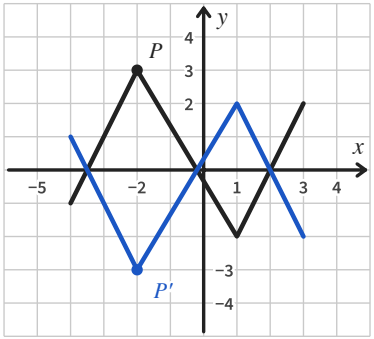


Reflection in the y axis

P goes to (−2, −3)

3

Sketch $y = -f(x)$. Reflect each corner.

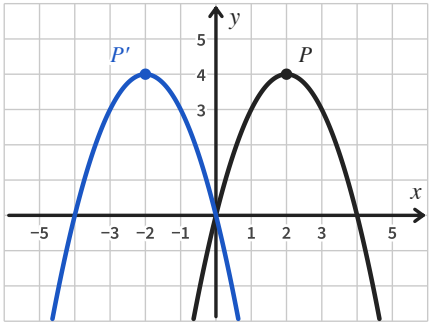


Reflection in the x axis

P goes to (−2, −3)

4

Sketch $y = f(-x)$.



Reflection in the y axis

P goes to (−2, 4)

5

Complete the table of values for $y = -f(x)$.

x	−2	−1	0	1	2
$f(x)$	5	0	−3	−4	−3
$-f(x)$	−5	0	3	4	3

Reflection in the x axis

(1, −4) goes to (1, 4)

6

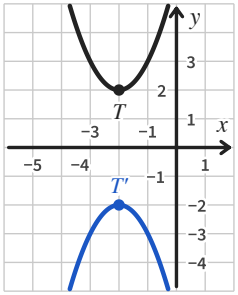
P(−3, 4) is on the graph of $y = f(x)$.
Where does P go on each graph?

On $y = -f(x)$, P goes to (−3, −4)

On $y = f(-x)$, P goes to (3, 4)

7

T is the turning point of $y = f(x)$. Jo says T goes to (2, 2) on $y = -f(x)$.
Explain her mistake.



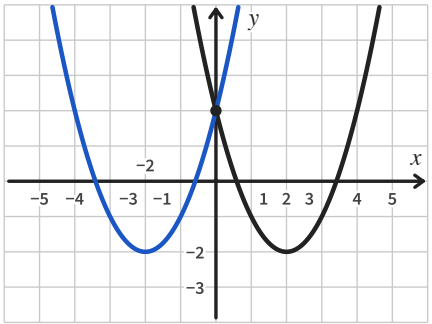
She reflected in the y axis.

Minus outside: the x axis.

T goes to (−2, −2)

8 Notice the change!

Sketch $y = f(-x)$. The point (0, 2) is on the y axis.



Reflection in the y axis

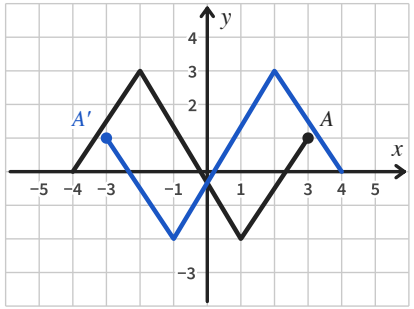
(0, 2) goes to (0, 2)

Graph transformations: reflections *further practice*

ANSWERS

9

Sketch $y = f(-x)$. Write down where A(3, 1) goes.



reflect each corner in the y axis

A(3, 1) goes to (−3, 1)

Answer *(−3, 1)*

10

The table gives some values of $f(x)$. Write down four points on the graph of $y = f(-x)$.

x	1	2	3	4
$f(x)$	5	2	1	2

x changes sign: f(−x) at x = −1 is f(1) = 5

Answer *(−1, 5), (−2, 2), (−3, 1), (−4, 2)*

11

$y = f(x)$ has a maximum point at (−4, 3). Write down the turning point of $y = -f(x)$ and of $y = f(-x)$. Is each a maximum or a minimum?

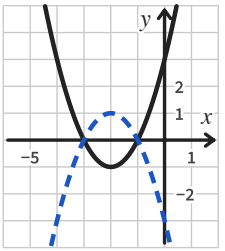
−f(x): (−4, −3), upside down: a minimum

f(−x): (4, 3), still a maximum

Answer *(−4, −3) min; (4, 3) max*

12

The dashed graph is a reflection of $y = f(x)$ (solid). Write down its equation.



it is upside down: a reflection in the x axis

Answer *y = −f(x)*

13

$f(x) = x^2 + 4x$. Write the equations of $y = f(-x)$ and $y = -f(x)$ without f.

f(−x) = (−x)² + 4(−x) = x² − 4x

−f(x) = −x² − 4x

Answer *y = x² − 4x; y = −x² − 4x*

14

A designer draws the right half of a logo as $y = f(x)$ for $0 \le x \le 4$. Its highest point is (3, 5). She reflects it in the y axis to make the left half. Write the equation of the left half and its highest point.

in the y axis: y = f(−x)

x changes sign: (3, 5) goes to (−3, 5)

Answer *y = f(−x); (−3, 5)*

15

$y = f(x)$ has a turning point at (1, 4). Write down the turning point of $y = -f(x) - 3$.

reflect in the x axis: (1, −4)

then down 3: (1, −7)

Answer *(1, −7)*

16

Nia says reflecting a graph in the y axis always gives a different graph. Use $f(x) = x^2 - 1$ to show she is wrong.

f(−x) = (−x)² − 1 = x² − 1 = f(x)

symmetrical about the y axis

Answer *same graph*