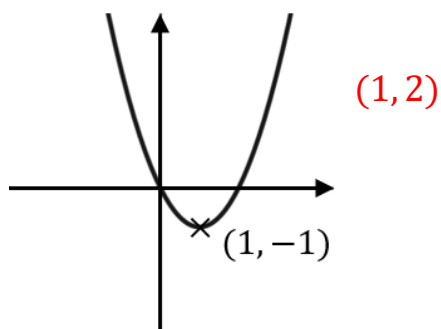


Transformations of Points on Graphs

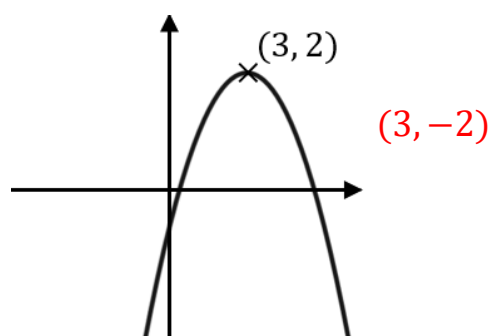
(a)

The curve $y = f(x)$ shown below has a minimum point with coordinates $(1, -1)$. Write down the coordinates of the minimum point of the curve $y = f(x) + 3$



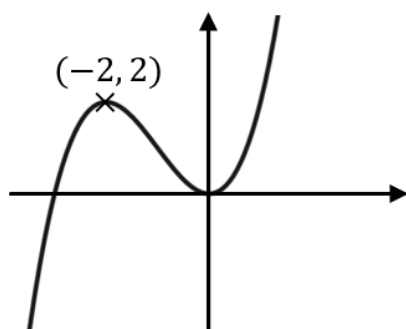
(b)

The point $P(3, 2)$ lies on the curve with equation $y = f(x)$ shown below. Write down the coordinates of the point P on the transformed curve $y = -f(x)$



(c)

The curve $y = f(x)$ shown below has a maximum point with coordinates $(-2, 2)$.



Write down the coordinates of the maximum point of the transformed curve

(i) $y = f(2x)$

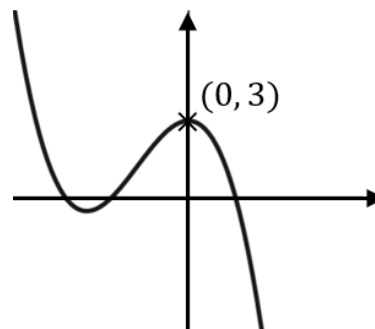
$(-1, 2)$

(ii) $y = f(x + 5)$

$(-7, 2)$

(d)

The curve $y = f(x)$ shown below has a maximum point with coordinates $(0, 3)$.



Write down the coordinates of the maximum point of the transformed curve

(i) $y = \frac{1}{2}f(x)$

$(0, 1.5)$

(ii) $y = f(-x)$

$(0, 3)$

(e)

The curve A with equation $y = f(x)$ is transformed to give the curve B with equation $y = f(-x) + 2$. The point $(1, 1)$ lies on the curve A . What point does this map to on the transformed curve B ?

$(-1, 3)$

(f)

The curve C with equation $y = f(x)$ is transformed to give the curve D with equation $y = -f(x + 1) - 2$. The point $(3, -2)$ lies on the curve C . What point does this map to on the transformed curve D ?

$(2, 0)$