STEP/Transformations Q5 (28/6/23)

What happens to the graph of $y = f(x)$ when it is transformed to: (a) $y = f(|x|)$ (b) $|y| = f(x)$

Solution

(a) When $x \geq 0$, $f(|x|) = f(x)$; when $x < 0$, $f(|x|) = f(-x)$; ie that part of $y = f(x)$ to the right of the y-axis is reflected in the y-axis.

So $y = f(|x|)$ is the right half of $y = f(x)$, together with its reflection in the y-axis.

(b) First of all, $|y| = f(x)$ is only defined for x such that $f(x) \geq 0$.

The graph of $|y| = f(x)$ is similar to that of $y^2 = f(x)$, or

$y = \pm\sqrt{f(x)}$, in that it has two branches: $y = f(x)$ and

$y = -f(x)$.

So, provided $f(x) \geq 0$, $|y| = f(x)$ is the same as $y = f(x)$, with the addition of its reflection in the x-axis.