1. The point $P(-2, -5)$ lies on the curve with equation $y = f(x)$, $x \in \mathbb{R}$

Find the point to which P is mapped, when the curve with equation $y = f(x)$ is transformed to the curve with equation

(a) $y = f(x) + 2$

(1)

(b) $y = |f(x)|$

(1)

(c) $y = 3f(x - 2) + 2$

(2)

(a) $f(x) + a$ is translation a units up parallel to y-axis, so

$$(-2, -5) \longrightarrow (-2, -5+2) = (-2, -3) \quad (1 \text{ mark})$$

(b) $|f(x)|$ reflects all negative y values in the x-axis, so

$$(-2, -5) \longrightarrow (-2, |-5|) = (-2, 5) \quad (1 \text{ mark})$$

(c) $f(x-2)$ maps $(-2, -5)$ to $(-2+2, -5) = (0, -5)$ $\quad (1 \text{ mark})$

$3f(x-2)$ maps $(-2, -5)$ to $(0, -5 \times 3) = (0, -15)$

$3f(x-2)+2$ maps $(-2, -5)$ to $(0, -15+2) = (0, -13)$ $\quad (1 \text{ mark})$