

5. Describe how the graph of each of the following functions can be obtained from the graph of $y = f(x)$. (Fill in table where appropriate).

(10)

FUNCTION	TRANSLATION (Horizontal/Vertical)	REFLECTION (x-axis/y-axis)	STRETCH/ COMPRESSION (Horizontal/Vertical)	MAPPING RULE
$y = -f(3x-6)+4$	-2 units right -4 units up	reflection in x axis	horizontal compression factor $\frac{1}{3}$	$(x,y) \rightarrow (\frac{1}{3}x+2, -y+4)$
$y = 4f(\frac{-1}{3}(x-6))$	-6 units right	reflection in y axis	-vertical s. factor 4 -horizontal s. factor 3	$(x,y) \rightarrow (-3x+6, 4y)$

6. The graph of $y = \sqrt{x}$ is compressed horizontally by a factor of $\frac{1}{3}$, reflected on the x-axis and translated 3 units upward and 2 units to the right. Write the equation of the transformed function, and state its domain and range.

(3.1.1)

EQUATION $y = -\sqrt{3(x-2)} + 3$

DOMAIN: $\{x \in \mathbb{R} / x \geq 2\}$

RANGE: $\{y \in \mathbb{R} / y \leq 3\}$

(ii) The graph of $y = x^2$ is expanded vertically by a factor of $\frac{3}{4}$, translated 5 units to the left, and translated 6 units downward. Write the equation of the transformed function, and state its domain and range.

(3.1.1)

EQUATION $y = \frac{3}{4}(x+5)^2 - 6$

DOMAIN: $\{x \in \mathbb{R}\}$

RANGE: $\{y \in \mathbb{R} / y \geq -6\}$