

Exercise 9

Suppose that the graph of f is given. Describe how the graphs of the following functions can be obtained from the graph of f .

(a) $y = f(x) + 8$

(b) $y = f(x + 8)$

(c) $y = 1 + 2f(x)$

(d) $y = f(x - 2) - 2$

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

(f) $y = f^{-1}(x)$

Solution

Part (a)

Shift the graph of $y = f(x)$ upward by 8 units.

Part (b)

Shift the graph of $y = f(x)$ leftward by 8 units.

Part (c)

Vertically stretch the graph of $y = f(x)$ by a factor of 2 and then shift it upward by 1 unit.

Part (d)

Shift the graph of $y = f(x)$ rightward by 2 units and then shift it downward by 2 units.

Part (e)

Reflect this graph over the x -axis.

Part (f)

Reflect this graph over the $y = x$ line.