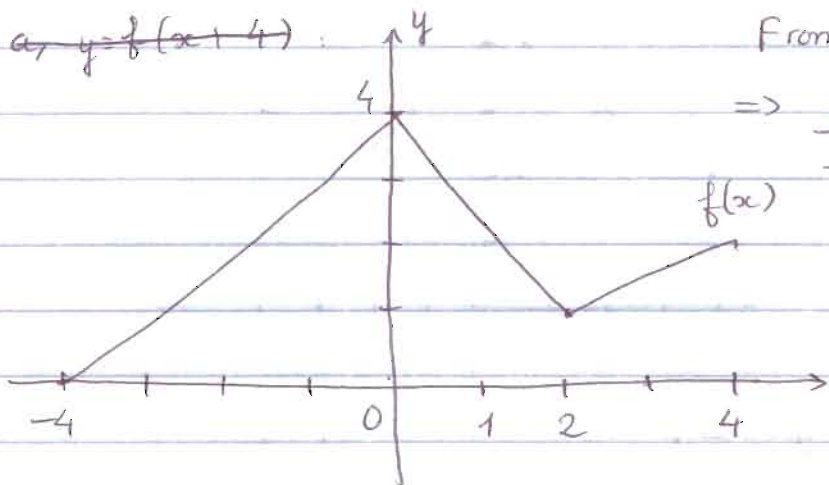


# Selected Solutions Hw #1

- 1.3 -

#4

a,  $y = f(x+4)$



From the graph

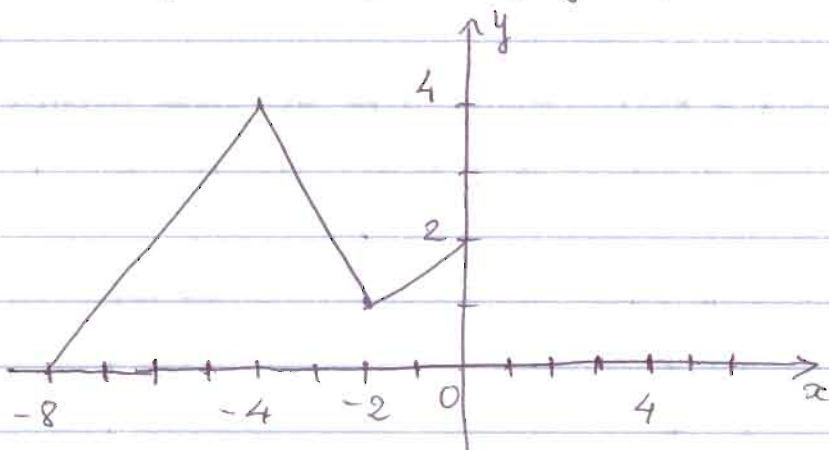
$x$	$f(x)$
-4	0
0	4
2	1
4	2

a,  $y = f(2x+4)$

$$x = -4 \Rightarrow y = f(-4+4) = f(0) = 4$$

$$x = 0 \Rightarrow y = f(0+4) = f(4) = 2 \text{ etc}$$

$\rightarrow$  ~~shift~~ Shift graph of  $f(x)$  4 units to the left to get the graph of  $y = f(2x+4)$ :

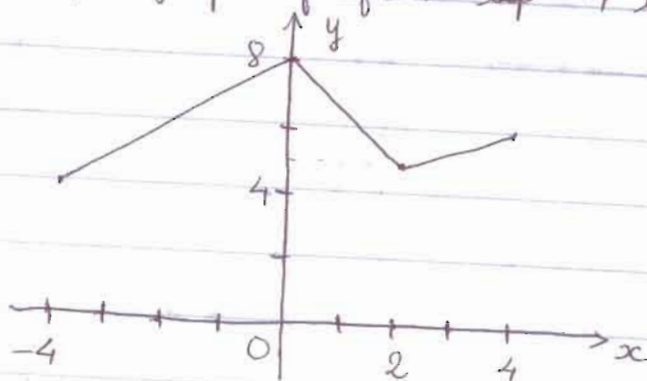


b,  $y = f(x)+4$

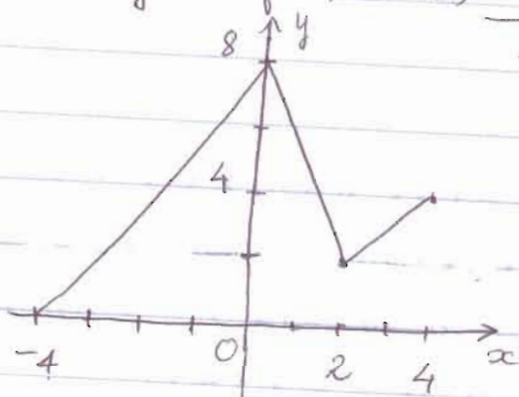
$x$	$y$
-4	$f(-4)+4 = 4$
0	$f(0)+4 = 8$
2	5
4	6

# Selected Solutions for #1

→ Shift graph of  $f(x)$  ~~up~~ 4 units upward:



c,  $y = 2f(x)$



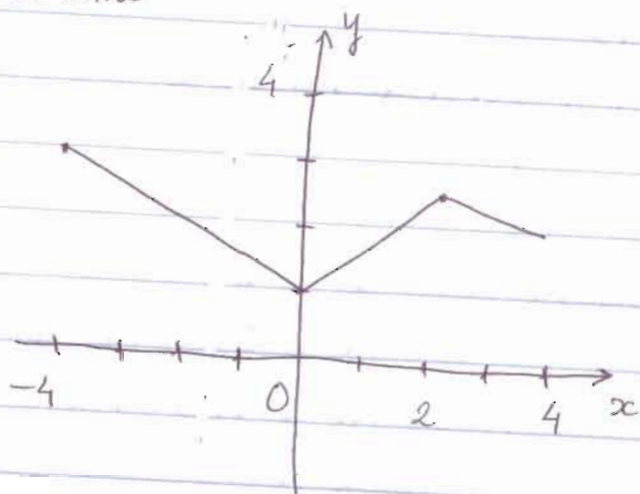
$x$	$y$
-4	$2f(-4) = 0$
0	$2f(0) = 8$
2	$2f(2) = 2$
4	$2f(4) = 4$

⇒ Stretch graph of  $f(x)$  vertically by a factor of 2.

d,  $y = \frac{1}{2}f(x) + 3$

reflect the graph above x-axis

shrink graph of  $f(x)$  vertically by a factor of 2. → shift the graph 3 units upward.



Verify:

$x$	$y$
-4	3
0	3
2	3.5
4	3

#36. Find  $f \circ g$ ,  $g \circ f$ ,  $f \circ f$ ,  $g \circ g$  and their domains

$$f(x) = 1 - x^3, \quad g(x) = \frac{1}{x}$$

$(D = \mathbb{R}) \qquad (D = \{x \mid x \neq 0\})$

$$f \circ g = f(g(x)) = f\left(\frac{1}{x}\right) = 1 - \left(\frac{1}{x}\right)^3 = 1 - \frac{1}{x^3}$$

$$D = \{x \mid x \neq 0\}$$

$$g \circ f = g(f(x)) = g(1 - x^3) = \frac{1}{1 - x^3}$$

$$D = \{x \mid (1 - x^3) \neq 0\} = \{x \mid x \neq 1\}$$

$$f \circ f = f(f(x)) = f(1 - x^3) = 1 - (1 - x^3)^3$$
$$= 1 - 1 + x^3 = x^3$$

$$D = \mathbb{R}$$

$$g \circ g = g(g(x)) = g\left(\frac{1}{x}\right) = \frac{1}{\frac{1}{x}} = x$$

$D = \{x \mid x \neq 0\}$  because 0 is not in the domain of  $g$ .