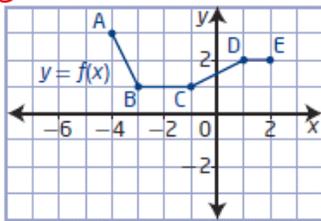
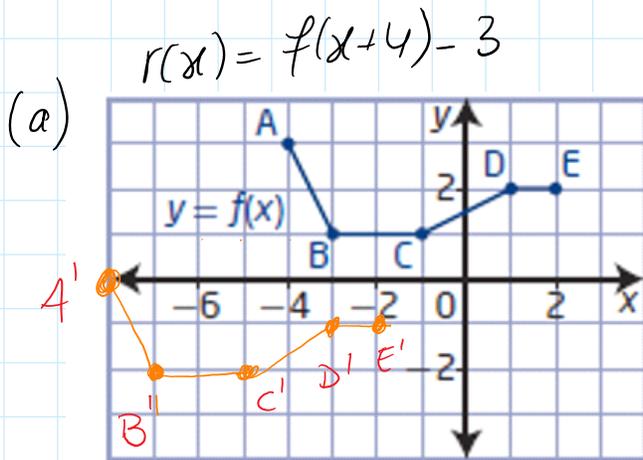


4. Given the graph of $y = f(x)$, sketch the graph of the transformed function. Describe the transformation that can be applied to the graph of $f(x)$ to obtain the graph of the transformed function. Then, write the transformation using mapping notation.

- a) $r(x) = f(x + 4) - 3$
- b) $s(x) = f(x - 2) - 4$
- c) $t(x) = f(x - 2) + 5$
- d) $v(x) = f(x + 3) + 2$



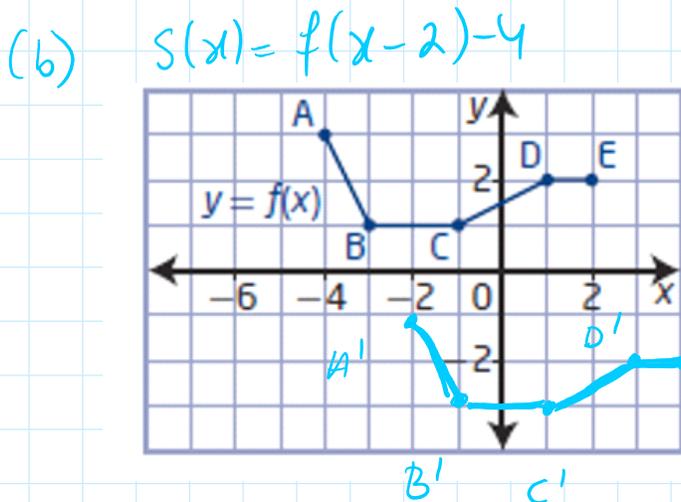
the bs func is given



the transformation moved the graph 4 points to the left & 3 points down

mapping notation:

$$(x, y) \rightarrow (x-4, y-3)$$



the graph was moved 2 units to the right & 4 units down.

mapping notation:

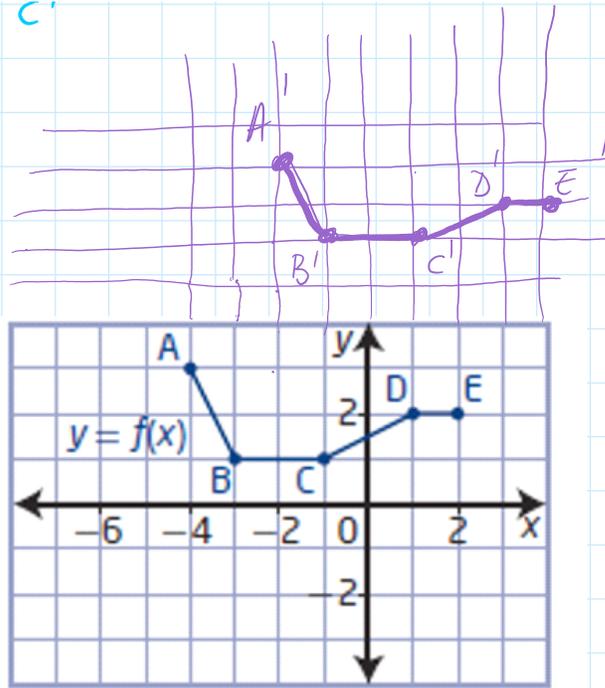
$$(x, y) \rightarrow (x+2, y-4)$$

(c) $t(x) = f(x-2) + 5$

the transformation moved the graph 2 units to the right & 5 units up.

The mapping notation:

$(x, y) \rightarrow (x+2, y+5)$



d) $v(x) = f(x+3) + 2$

the function was moved 3 units to the left and 2 units up.

The mapping notation is:

$(x, y) \rightarrow (x-3, y+2)$

