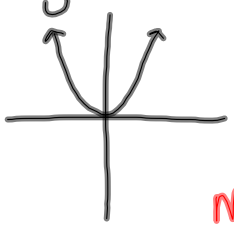
Chapter 1: Transformations and Functions

Section 1.1: Horizontal & Vertical Translation

Recall with parabolas

$y = x^2$



$y = (x+3)^2 - 1$

- $+3$: horizontal translation of 3 units left.
- -1: vertical translation of 1 unit down

Mapping: $(x, y) \to (x-3, y-1)$

Translations

$f(x) \to$ any function

$y - K = f(x)$ or $y = f(x) + K \Rightarrow$ vertical of K units

$y = f(x-h) \Rightarrow$ horizontal translation of h units.

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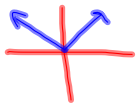
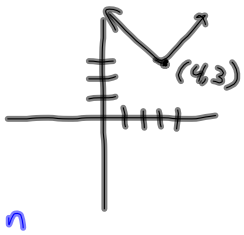
$y = |x-4| + 3$

- -4: H.t of 4 units right
- $+3$: V.t. of 3 units up.

$y = |x|$ absolute value

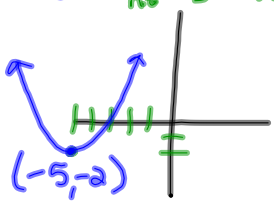




Your turn

$y = (x+5)^2 - 2$

ht -5 v.t -2



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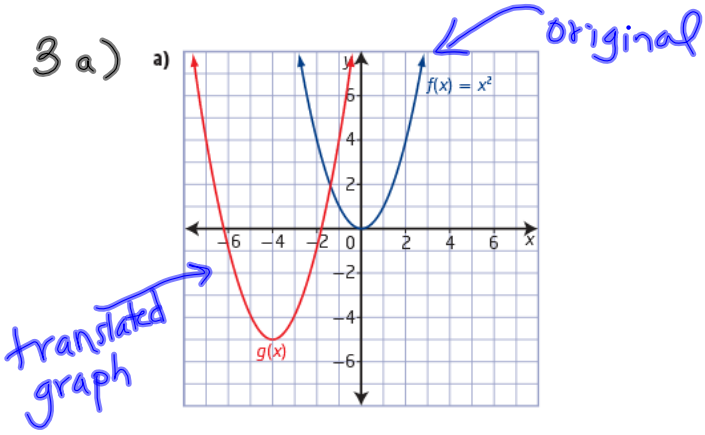


H.t of 4 units left
V.t of 5 units down

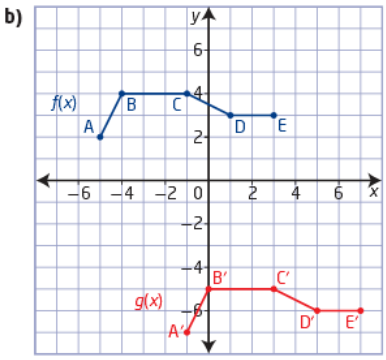
mapping: $f(x) \rightarrow g(x)$

$(x, y) \rightarrow (x-4, y-5)$

$y - k = f(x-h)$

$\boxed{y+5 = f(x+4)}$

or $y = f(x+4) - 5$



v.t of 9 units down

h.t of 4 units right

$(x, y) \rightarrow (x+4, y-9)$

$y + 9 = f(x-4)$