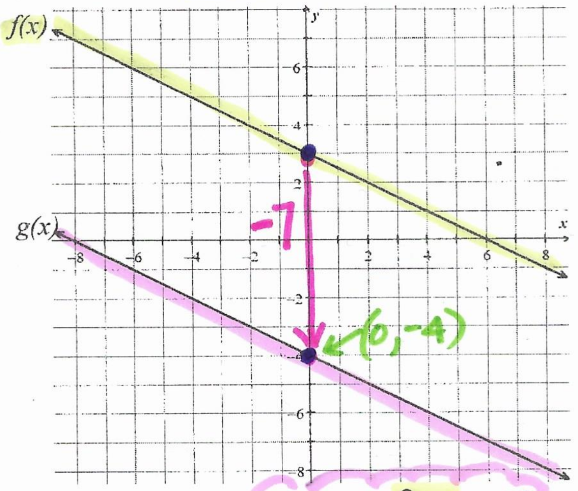
Transformation of Functions

If you add a number to or subtract a number from an entire function, it causes a vertical translation of the original function. Given some function $f(x)$, $g(x) = f(x) + k$ is known as the transformation form of $g(x)$. The constant k is not grouped with x, so k affects the outputs, or y-values, of the original function. If the value of $k < 0$, the graph of $g(x)$ would be the same as the graph of $f(x)$, just Shifted DOWN k units. If the value of $k > 0$, the graph of $g(x)$ would be the same as the graph of $f(x)$, just Shifted UP k units.

Examples:

1. Use the given form to write the equation for g(x) in translation and slope-intercept form.

$$f(x) = -\frac{1}{2}x + 3$$



Translation form: $g(x) = f(x) - 7$

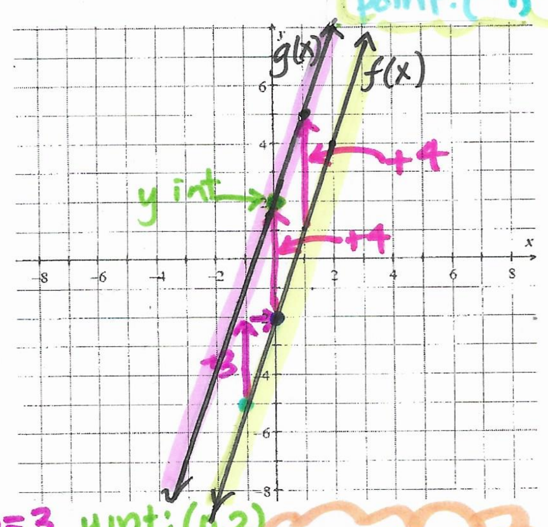
Slope-Intercept form: $g(x) = -\frac{1}{2}x - 4$

$g(x) = -\frac{1}{2}x + 3 - 7$

$= -\frac{1}{2}x - 4$

2. Graph the functions, if $f(x) = 3(x+1) - 5$ and $g(x) = f(x) + 4$. Then simplify $g(x)$ into slope intercept form.

m=3
point: (-1, -5)



//m=3 yint: (0,2)

Slope-Intercept form: $g(x) = 3x + 2$

$g(x) = 3(x+1) - 5 + 4$

$= 3x + 3 - 5 + 4$

$= 3x - 2 + 4$ → $g(x) = 3x + 2$

3. If $f(x) = 2(3)^{x-2}$ and $g(x) = f(x) - 5$.

then $g(x) = 2(3)^{x-2} - 5$.

EXPONENTIAL

Clearly shows K value!
*cannot simplify equation!

3. If $h(x) = 4x + 5$ and $k(x) = h(x) - 3$.

$= 4x + 5 - 3$

then $g(x) = 4x + 2$.

Linear

HIDES the K value when simplified!