

1. Consider the following linear functions:

$$a(x) = 4x - 3 \quad b(x) = -x + 8 \quad c(x) = 3x + 4$$

Determine the slopes of the following combinations of those functions without expanding them. Show your work.

(a)  $a(x) + b(x)$

(b)  $4c(x) + a(x)$

(c)  $a(c(x)) - 5$

(d)  $c(a(x) + 2b(x))$

2. Describe in words how the following linear functions transform a graph when applied on the left (in other words, compare the graphs of  $\ell(f(x))$  and  $f(x)$ ):

(a)  $2x + 4$

(b)  $-3x - 1$

(c)  $x + 20$

(d)  $\frac{1}{4}x + 1$

(e)  $\frac{3}{2}x - 5$

3. Using the same functions as in Question 2, but describe how the linear functions transform a graph when applied on the right (i.e.  $f(\ell(x))$ ).

4. Using the functions  $a(x)$ ,  $b(x)$ ,  $c(x)$  from Question 1, calculate all of the products  $a(x)b(x)$ ,  $a(x)c(x)$ ,  $b(x)c(x)$ . What is the linear coefficient of each of the resulting functions? What do you notice?