



9.2 Combining Two Functions: Sums and Differences

"I can add and subtract functions. I know their main properties.  
I can apply what I have learned in unfamiliar settings."

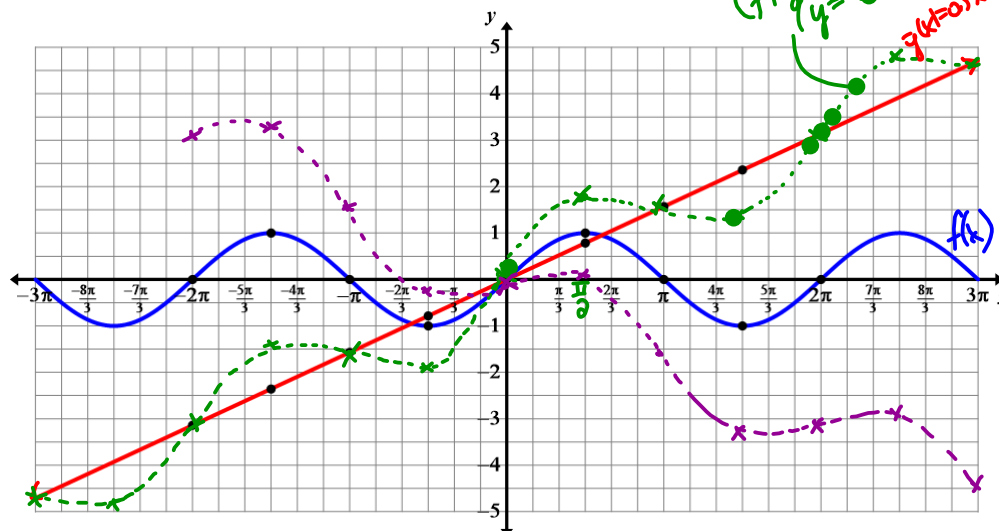
Ex. 1:

Below are the graphs of the functions  $f(x) = \sin x$  and  $g(x) = 0.5x$ .

On the interval  $[-3\pi, 3\pi]$

a) graph  $f(x) + g(x)$ , which is the same as  $(f + g)(x)$

b) graph  $f(x) - g(x)$ , which is the same as  $(f - g)(x)$



The **domain** of  $f + g$  and  $f - g$  is the **intersection** of the domains of  $f$  and  $g$ .  
This means that the functions  $f + g$  and  $f - g$  are only defined where the domains of both  $f$  and  $g$  overlap.

c) State the domain of both new functions.

$D_f : \{x \in \mathbb{R}\}$

$D_g : \{x \in \mathbb{R}\}$

$\therefore D_{f+g} : \{x \in \mathbb{R}\}$

also  $D_{f-g} : \{x \in \mathbb{R}\}$

"Where they overlap"

Ex. 2:

Given:  $f(x) = \log(x)$ ,  $g(x) = 2^x$ ,  
State the domain and range of  $f + g$ .

$D_f : \{x \in \mathbb{R} \mid x > 0\}$

$D_g : \{x \in \mathbb{R}\}$



$D_{f+g} : \{x \in \mathbb{R} \mid x > 0\}$   
"where they overlap"

From the graph

$R_{f+g} : \{y \in \mathbb{R}\}$

