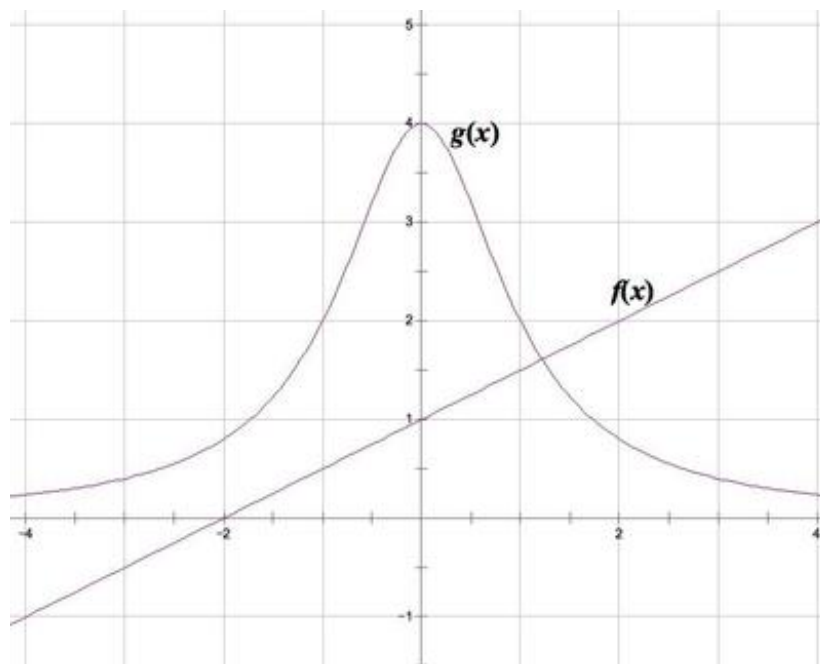


# F-BF A Sum of Functions

Alignments to Content Standards: F-BF.A.1.b F-BF.A.1

## Task

Using the graphs below, sketch a graph of the function  $s(x) = f(x) + g(x)$ .



## IM Commentary

The intent of this problem is to have students think about how function addition works on a fundamental level, so formulas have been omitted on purpose. In the graph shown,  $g(x) = \frac{4}{x^2+1}$ . The task may be extended by asking students to sketch the graph

of  $d(x) = f(x) - g(x)$ .

Although this problem does not ask students to "write a function that describes a relationship between two quantities", it can provide students with understandings preparatory for F.BF.1b. In addition, this task makes use of the reasoning required for F.BF.3.

Source: Hilton Russell

## Solutions

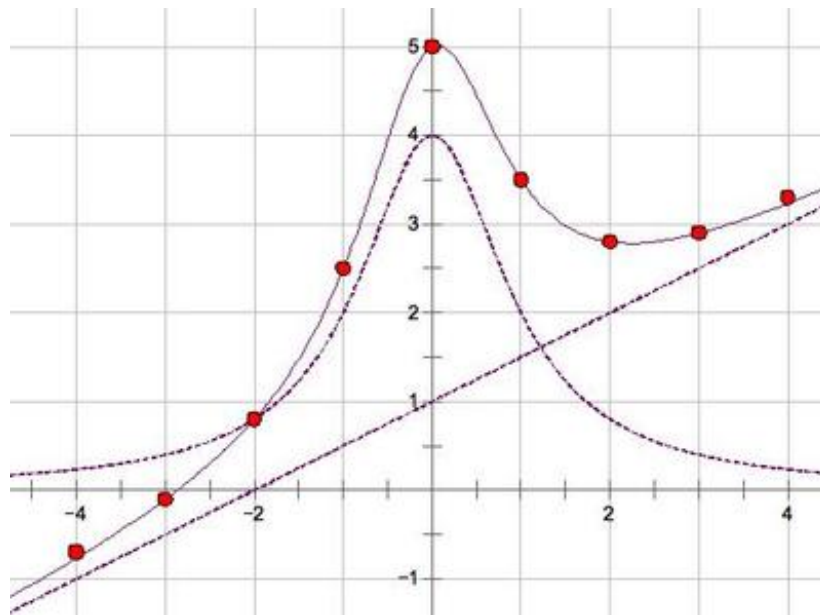
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### **Solution: Graphical solution**

Students can create the graph shown below by:

- visually estimating the distance between the graph of  $f$  and the  $x$ -axis at a particular integer value of  $x$ , and
- plotting a point this distance above (or below, if the  $f(x)$  value is negative) the graph of  $g$ .

Some students may want to use a strip of paper to mark a distance and then use the mark to help them plot the point.

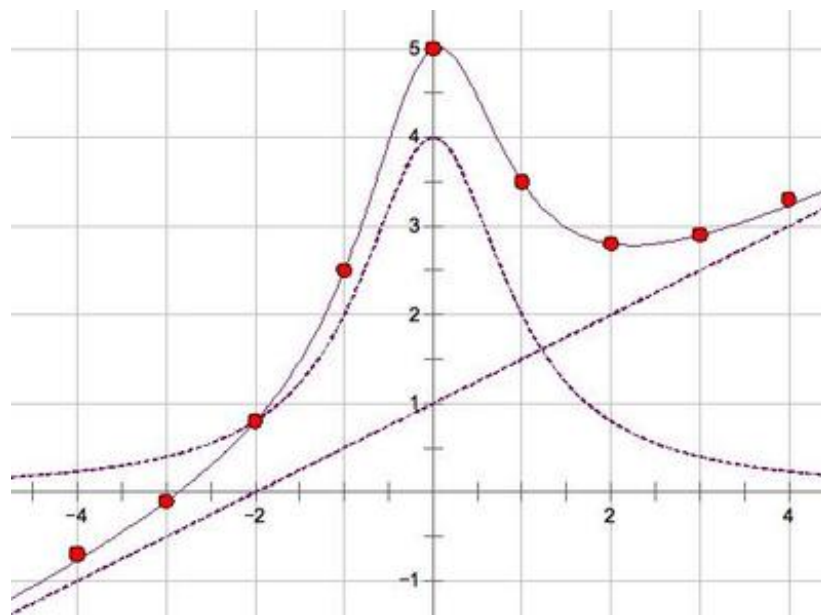


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### **Solution: Numerical solution**

Students may also create a chart of approximate values of  $f(x)$  and  $g(x)$  at various  $x$ -values by estimating from the provided graphs. We then add a row of  $s(x)$  values by summing the two rows above. Finally, we plot points of the form  $(x, s(x))$  to sketch the graph of  $y = s(x)$ .

$f(x) \approx$	-1	-0.5	0	0.5	1	1.5	2	2.5	3
$g(x) \approx$	0.2	0.4	0.8	2	4	2	0.8	0.4	0.2
$s(x) = f(x) + g(x) \approx$	-0.8	-0.1	0.8	2.5	5	3.5	2.8	2.9	3.2



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