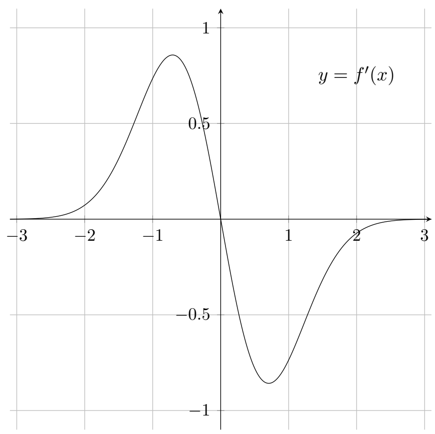
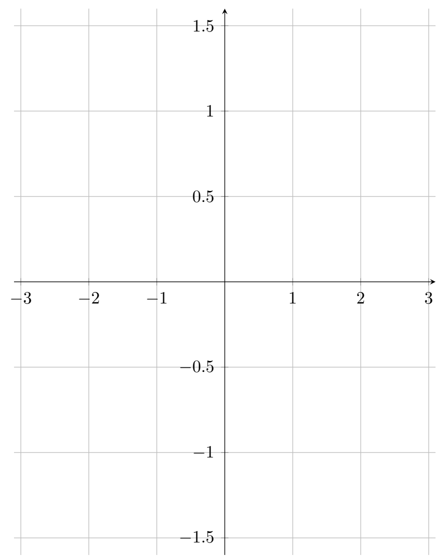
1. Given the two derivatives below, sketch the two original functions.

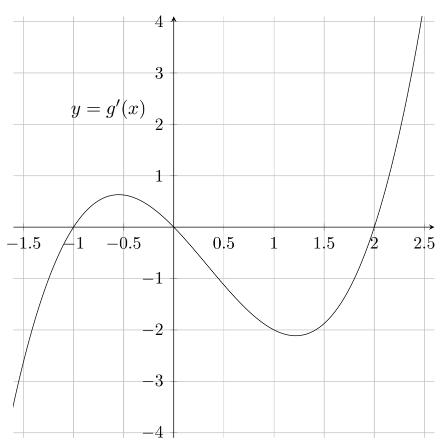
$f'(x)$ on the interval $[-2, 2]$



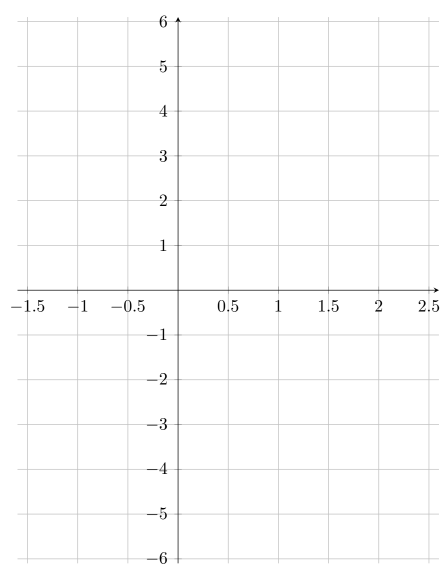
Sketch $f(x)$ on the interval $[-2, 2]$



$g'(x)$ on the interval $[-1.5, 2.5]$



Sketch $g(x)$ on the interval $[-1.5, 2.5]$



2. Could you give another possible antiderivative in either of the two examples? How many antiderivatives could a function have? How are they related?

3. Suppose that $F'(x) = f(x)$, $G'(x) = g(x)$ and c is a constant. Fill in the following table, where you can!

Function	**Particular antiderivative**
x^n $(n \neq -1)$	
$\frac{1}{x}$	
e^x	
e^{x^2}	
$\cos(x)$	
$\sin(x)$	
$\tan(x)$	
$\frac{1}{\cos^2(x)}$	
$c \cdot f(x)$	
$f(x) + g(x)$	
$F(x) \cdot g(x) + f(x) \cdot G(x)$	
$f(x) \cdot g(x)$	
$\frac{1}{1+x^2}$	
$\frac{x^2-2}{x^4+2x^2-3}$	

Theorem. *If F is an antiderivative of f on an interval $[a,b]$, then any other antiderivative of f on $[a,b]$ is of the form*

$$F(x) + C$$

where C is a constant.

In any particular scenario, the constant term can be determined if you specify one value of the antiderivative. In the following questions, please find the particular antiderivatives $f(x)$.

4. $f'(x) = \sqrt{x}(6+5x)$ where $f(1) = 10$.

5. $f'(x) = \frac{4}{\sqrt{1-x^2}}$ where $f(1/2) = 1$.

6. $f''(x) = 2 + \cos(x)$ where $f'(0) = 2$ and $f(0) = 3$.