

Write the limit definition of the derivative of each of the following functions at the given x -value. If no x -value is stated, then write the limit definition of the derivative at x .

#	$f(x)$	x -value	Limit definition of the derivative using h or Δx
1.	$2x^2 - 7x$	$x = 2$	$\lim_{h \rightarrow 0} \frac{[2(2+h)^2 - 7(2+h)] - [2(2)^2 - 7(2)]}{h}$
2.	$\sin(x)$		$\lim_{h \rightarrow 0} \frac{\sin(x+h) - \sin(x)}{h}$
3.	$\log_2(x+1)$	$x = 7$	$\lim_{\Delta x \rightarrow 0} \frac{\log_2((7+\Delta x)+1) - \log_2((7)+1)}{\Delta x}$
4.	e^{x^2}		$\lim_{h \rightarrow 0} \frac{e^{(x+h)^2} - e^{x^2}}{h}$
5.	$\arctan(x)$	$x = \frac{1}{2}$	$\lim_{\Delta x \rightarrow 0} \frac{\arctan\left(\frac{1}{2} + \Delta x\right) - \arctan\left(\frac{1}{2}\right)}{\Delta x}$
6.	3^{5-x}	$x = 2$	$\lim_{h \rightarrow 0} \frac{3^{5-(2+h)} - 3^{5-(2)}}{h}$
7.	$\csc(-x)$		$\lim_{h \rightarrow 0} \frac{\csc(-(x+h)) - \csc(-x)}{h}$
8.	$\frac{1}{x+1}$		$\lim_{\Delta x \rightarrow 0} \frac{\frac{1}{(x+\Delta x)+1} - \frac{1}{x+1}}{\Delta x}$
9.	$\sqrt{x+2}$		$\lim_{\Delta x \rightarrow 0} \frac{\sqrt{(x+\Delta x)+2} - \sqrt{x+2}}{\Delta x}$
10.	$ 2x+7 $	$x = -2$	$\lim_{h \rightarrow 0} \frac{ 2(-2+h)+7 - 2(-2)+7 }{h}$