

Limit Definition of a Derivative

name _____

1. $\lim_{h \rightarrow 0} \frac{\sin(x+h) - \sin x}{h} =$ _____

2. $\lim_{h \rightarrow 0} \frac{(x+h)^2 - 2(x+h) - 3 - (x^2 - 2x - 3)}{h} =$ _____

3. $\lim_{h \rightarrow 0} \frac{2(x+h)^2 - (x+h) + 3 - (2x^2 - x + 3)}{h} =$ _____

4. $\lim_{h \rightarrow 0} \frac{2(2+h)^2 - (2+h) + 3 - 2(2)^2 + 2 - 3}{h} =$ _____

5. $\lim_{h \rightarrow 0} \frac{\cos(\pi + h) - \cos \pi}{h} =$ _____

6. Use the limit definition to find the derivative of $f(x) = x^2 - 2x$

7. Use the limit definition to find the slope of the tangent line of $f(x)$ at $x=3$.

$$f(x) = \frac{1}{x+2}$$