

# AP CALCULUS - Definition of Derivative Worksheet

The given limit is a derivative, but of what function and at what point?

$$1. \lim_{h \rightarrow 0} \frac{2(5+h)^3 - 2(5)^3}{h}$$

$$2. \lim_{\Delta x \rightarrow 0} \frac{4(3 + \Delta x)^3 - 4(3)^3}{\Delta x}$$

$$3. \lim_{h \rightarrow 0} \frac{5(2+h)^3 + 8(2+h) - 56}{h}$$

$$4. \lim_{\Delta x \rightarrow 0} \frac{5(2 + \Delta x)^2 - 20}{\Delta x}$$

$$5. \lim_{\Delta x \rightarrow 0} \frac{2(1 + \Delta x)^3 + 4(1 + \Delta x) - 6}{\Delta x}$$

$$6. \lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$$

$$7. \lim_{x \rightarrow 3} \frac{x^3 + x - 30}{x - 3}$$

$$8. \lim_{x \rightarrow t} \frac{\frac{2}{x} - \frac{2}{t}}{x - t}$$

$$9. \lim_{x \rightarrow p} \frac{x^3 - p^3}{x - p}$$

$$10. \lim_{\Delta x \rightarrow 0} \frac{\sin\left(\frac{\pi}{2} + \Delta x\right) - 1}{\Delta x}$$