

SL Math: Limits & Derivatives

Evaluate each limit by factoring and canceling.

$$[1] \lim_{x \rightarrow 5} \frac{x^2 - 10x + 25}{x^2 - 25}$$

$$[2] \lim_{x \rightarrow 1} \frac{x-1}{x^2 - 5x + 4}$$

$$[3] \lim_{x \rightarrow -2} \frac{x^2 - 2x - 8}{x^2 + 6x + 8}$$

Evaluate each limit by multiplying top and bottom by the conjugate of the numerator.

$$[4] \lim_{x \rightarrow 5} \frac{\sqrt{x+4} - 3}{x-5}$$

$$[5] \lim_{x \rightarrow 12} \frac{\sqrt{2x+1} - 5}{x-12}$$

$$[6] \lim_{x \rightarrow 10} \frac{\sqrt{x-6} - 2}{x-10}$$

Find each derivative value by evaluating $\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$.

$$[7] \text{ Find } f'(2) \text{ for } f(x) = x^2 + 2$$

$$[8] \text{ Find } f'(4) \text{ for } f(x) = x^2 + x + 1$$

$$[9] \text{ Find } f'(2) \text{ for } f(x) = \sqrt{x+7}$$

$$[10] \text{ Find } f'(1) \text{ for } f(x) = \sqrt{3x+1}$$