

1.  $\lim_{x \rightarrow 0} \frac{\sqrt{x+5} - \sqrt{5}}{x} =$

2.  $f(x) = \sqrt{3x+1}$  Find  $f'(x)$

3. Find an equation of the tangent line to the graph of  $f(x) = x^3 + 1$  that passes through the point  $(1, 2)$ .

4.  $f(x) = \frac{x^2 + 2}{2x - 7}$  Find  $f'(x)$

5.  $g(x) = \frac{\sin x}{x^2}$  Find  $g'(x)$

6.  $y = \sin^2(\pi x)$  Find  $y'$

7.  $y = \sin(\cos x)$  Find  $y'$

8.  $x^2y + y^2x = -2$  Find  $\frac{dy}{dx}$

9. Write the Maclaurin series for  $e^x$

10. The height of a cone is 3 times the radius. Find the rate of change of the volume when the radius is 2 inches if the radius is increasing at a rate of 3 inches per minute.

11. Find the x-coordinate of the relative **minimum** of  $f(x) = x^3 + 12x^2 + 45x - 7$ . Justify your answer.