

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} =$$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} =$$

$$\frac{d}{dx} \sin x =$$

$$\frac{d}{dx} \cos x =$$

Find each of the following. (Do **NOT** use L'Hospital's rule on # 1 or 2)

1. $\lim_{x \rightarrow 0} x \cot(3x)$

2. $\lim_{x \rightarrow 0} \tan(2x) \cot(5x)$

3. Find the equation of the tangent line to $y = \cos(2x)$ at $x = \frac{\pi}{4}$.

In 4 – 6, find $\frac{dy}{dx}$.

4. $y = \cos^4 x$

5. $y = \sin(x^2)$

6. $y = (\ln(\cos(e^{5x})))^3$

In 7 – 8, find the limits. (You might find L'Hospital's Rule helpful.)

7. $\lim_{x \rightarrow 2} \frac{\ln(5x-9)}{x^3-8}$

8. $\lim_{x \rightarrow 0} \frac{2-x^2-2\cos x}{x^4}$