Honors Brief Calculus Trigonometry Worksheet Name_____

PART I

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

1. $\lim_{x\to 0}\frac{\sin\left(\frac{1}{2}x\right)}{x} =$
2. $\lim_{x\to 0} x\csc x =$
3. $\lim_{x\to 0}\frac{\sin(2x)}{\sin x} =$
4. $\lim_{x\to 0}\frac{\sin(ax)}{x} =$
5. $\lim_{x\to 0}\frac{\tan x}{x} =$
6. $\lim_{x\to 0}\frac{\sin(3x)}{\sin(2x)} =$
7. $\lim_{x\to 0}\frac{1-\cos x}{\sin x} =$
8. $\lim_{x\to 0}\frac{1-\cos^2 x}{x^2} =$
9. $\lim_{x\to 0}\frac{x-\sin x}{x} =$
10. $\lim_{x\to 0}\frac{1-\cos x}{x^2} =$
11. $\lim_{x\to 0}\frac{1-\cos x}{\sin^2 x} =$
12. $\lim_{h\to 0}\frac{\sin h}{2h} =$
13. $\lim_{x\to 0}\frac{\sin(6x)}{\sin(8x)} =$
14. $\lim_{x\to 0}\frac{\tan(7x)}{\sin(3x)} =$
15. $\lim_{\theta\to 0}\frac{\sin^2\theta}{\theta} =$

PART II

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

$\frac{d}{dx}\cot x =$ $\frac{d}{dx}\sec x =$ $\frac{d}{dx}\csc x =$

16. Find the equation of the tangent line to $y = \cos x$ at $x = \frac{\pi}{6}$.

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

Find $\frac{dy}{dx}$.

18. $y = \sec(3x)$

19. $y = \sin\left(x^5\right)$

20. $y = \cos^6 x$

21. $y = \sin x \cos x$

22. $y = \sin x - x\cos x$

23. $y = 2x^2 - 2x\sin(2x) - \cos(2x)$

24. $y = \left(\ln\left(\cos\left(e^{3x}\right)\right)\right)^4$

PART III

Find the limit using L'Hospital's Rule.

25. $\lim_{x\to 1}\dfrac{\ln x}{x-1}$

26. $\lim_{x\to 0}\dfrac{\sin(2x)}{\sin(5x)}$

27. $\lim_{\theta\to 0}\dfrac{\tan\theta}{\theta}$

28. $\lim_{x\to 0}\dfrac{e^x - 1}{\sin x}$

29. $\lim_{x\to 3}\dfrac{x-3}{3x^2-13x+12}$

30. $\lim_{t\to 0}\dfrac{te^t}{1-e^t}$

31. $\lim_{x\to 0^+}\dfrac{e^x+e^{-x}-2}{1-\cos 2x}$

32. $\lim_{x\to 0^+}\dfrac{1-e^{-2x}}{x^2+3x}$

33. $\lim_{x\to 2}\dfrac{\ln(5x-9)}{x^3-8}$

34. $\lim_{x\to 0}\dfrac{x-\ln(x+1)}{1-\cos(2x)}$

35. $\lim_{x\to 0}\dfrac{2-x^2-2\cos x}{x^4}$

36. $\lim_{x\to -1}\dfrac{x^2-1}{\ln(3x+4)}$