WORKSHEET V

trigonometric limits *(review)*

I Evaluate each of the following limits or explain why the limit fails to exist.

1. $\lim_{x\to 0} \dfrac{\sin 4x}{x}$

2. $\lim_{x\to 0} \dfrac{\tan 5x}{x}$

3. $\lim_{x\to 0} \dfrac{\sin 2x}{\sin 8x}$

4. $\lim_{x\to \infty} \dfrac{\sin 13x}{x}$

5. $\lim_{x\to 0} \dfrac{\cos 3x}{x}$

6. $\lim_{x\to 0+} x\sin\left(\dfrac{1}{x}\right)$

7. $\lim_{x\to 0} \dfrac{\cos 11x}{\cos 13x}$

8. $\lim_{x\to 0} \dfrac{\tan^2 x}{x^2}$

9. $\lim_{x\to 0} \dfrac{\sin^2 x}{x}$

10. $\lim_{x\to 0+} \dfrac{|x|}{x}$

11. $\lim_{x\to 5-} \dfrac{x(x-5)(x-3)^2}{|x-5|}$

12. $\lim_{x\to 0}\dfrac{1-\cos x}{x}$

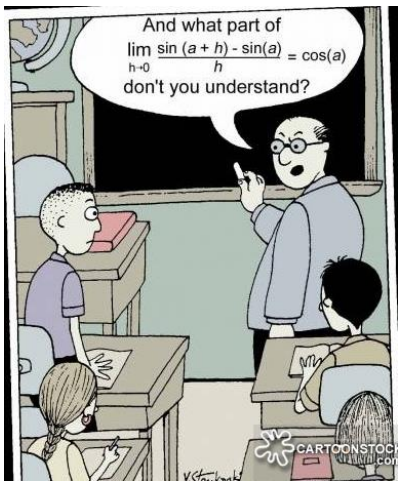
13. $\lim_{x\to 5}\sqrt{\dfrac{x-5}{x+1}}$

14. $\lim_{x\to 0}\dfrac{\sin(\sin x)}{\sin x}$

15. $\lim_{x\to 0} x\csc x$

16. $\lim_{x\to 3-}\dfrac{(x+4)(x-3)}{|x-3|}$

17. $\lim_{x\to 0}\cos(1/x)$



18. $\lim_{x\to 3-}\sqrt{9-x^2}$

II 1. Prove that $\lim_{x\to 0}\dfrac{\sin x}{x}$.

2. Prove, using (1) and a trigonometric identity, that $\lim_{x\to 0}\dfrac{1-\cos x}{x}=0$.

I used to love mathematics for its own sake, and I still do, because it allows for no hypocrisy and no vagueness…

- Stendhal, **The Life of Henri Brulard**