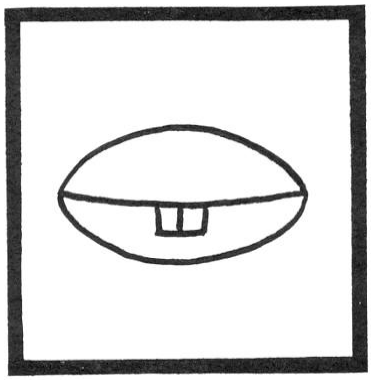
Calculus Droodle Review – Trig Derivatives

A Puzzle by David Pleacher



You may have thought the title of this droodle was "Football with a Picture Window," but the real title is

___	___	___	___		___	___	___	___		___	___	___	___		___	___	___	___	___
12	3	11	6		5	14	4	10		8	9	12	7		4	1	1	4	10

To determine the title, solve the problems below and on the next page; then find the letter corresponding to the correct answer, and place that letter in the blank above.

Problems

___ 1. Determine $\frac{dy}{dx}$ if $y = \cot x$

___ 2. Graph $y = \csc x$ for $0 < x < 2\pi$

___ 3. If $y = \cos(2x)$, determine $\frac{d^{80}y}{dx^{80}}$

___ 4. If $y = \sec x$, determine y'

___ 5. Evaluate $\lim_{\vartheta \to 0} \frac{\sin 3\vartheta}{\vartheta}$

___ 6. Evaluate $\lim_{x \to \infty} 2x \sin\left(\frac{1}{x}\right)$

___ 7. Evaluate $\lim_{x \to 0} x \cot(2x)$

___ 8. If $y^2 = \sin(x)$, determine $\frac{dy}{dx}$

___ 9. If $y = \sin^2 x + \cos^2 x$, determine $\frac{d^2y}{dx^2}$

Answers

A. $\frac{-2\cos x}{\sin^3 x}$

B. $\frac{\cos x}{2y}$

C. $\frac{5}{3}$

D. $8\cos 4x$

E. $-\frac{1}{\sin^2 x}$

F. $2^{80}\sin(2x)$

H. $-8\cos(4x)\sin(4x)$

I. $\frac{2x-2}{49}$

K. $\frac{1}{2}$

___ 10. If $y = \cos^2(4x)$, determine $\frac{dy}{dx}$

___ 11. If $y = \frac{1}{\sin^2 x}$, determine $\frac{dy}{dx}$

___ 12. Evaluate $\lim_{x \to 0} \sin(5x)\cot(3x)$

___ 13. Graph $y = \tan x$ for $0 < x < 2\pi$

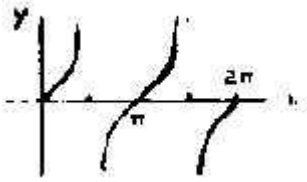
___ 14. If $y = t^2$ and $x = 7t + 1$, determine $\frac{dy}{dx}$

___ 15. If $y = 2u^2$ and $u = 4x - 7$, determine $\frac{dy}{dx}$

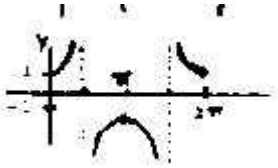
L. $2^{80}\cos(2x)$

M. 2

N.



P.



T. $\tan(x)\sec(x)$

U. 0

W. 3

X. $80\cos(2x)$

Y. None of the above