MATH 100, Tutorial 5
(Week of February 12, 2024)

Exercise 1 *Compute the following limits*

(a) $\lim\limits_{x \to 8} \dfrac{2(x-8)\sin(x-8)}{(2x-16)^2}$.

(b) $\lim\limits_{x \to 0} \dfrac{\tan x}{x}$.

(c) $\lim\limits_{x \to 0} \dfrac{1 - \cos x + 5x}{x}$.

Exercise 2 *Find the values of x **in the interval** $[0, \pi]$ solving each of the following equations*

(a) $10 \cos^2 x = 5$.

(b) $\sin 3x = 1/2$.

Exercise 3 *Compute $f'(x)$ in each of the following cases.*

(a) $f(x) = \dfrac{1}{x \cos 3x}$

(b) $f(x) = (x + \sin x)(1 - \cos(2x + 3))$

(c) $f(x) = \dfrac{\cos x - \sin x}{\cos x + \sin x}$

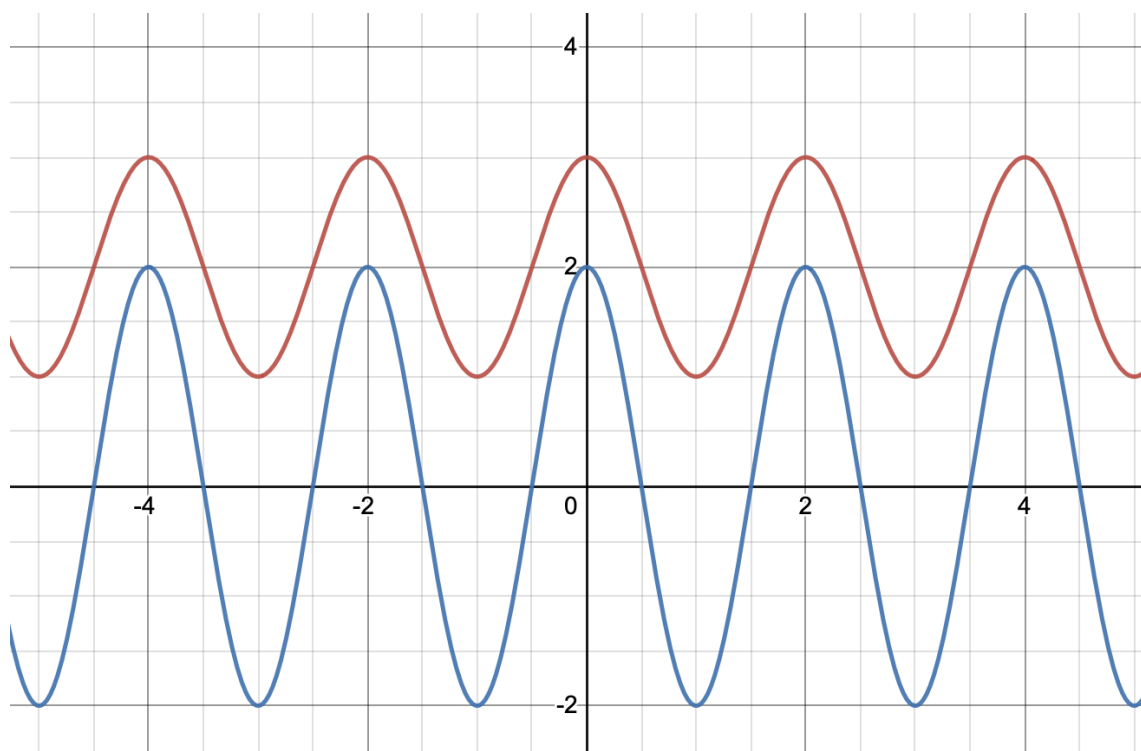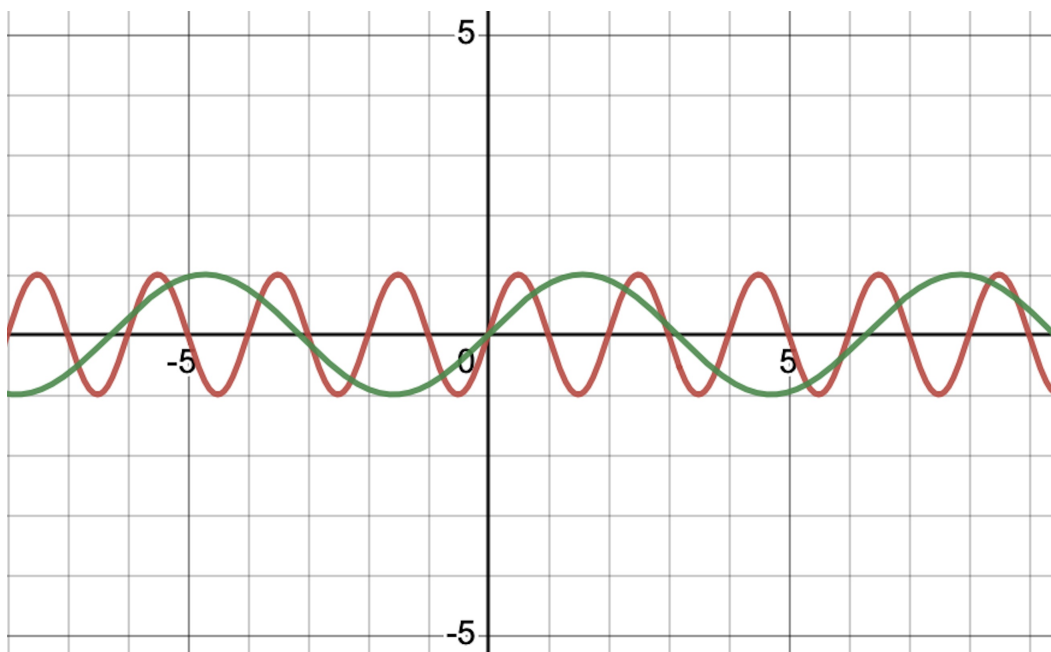*(d)* $f(x) = \dfrac{1 - \tan x}{1 + \tan x}$

Exercise 4 *On the next page, you see two diagrams. Each diagram shows 2 graphs for two of the four functions given in the list. Match each of the given functions to its graph.*

(a) $f(x) = 2 + \cos \pi x$

(b) $g(x) = \sin x$

(c) $h(x) = \sin \pi x$

(d) $k(x) = 2 \cos \pi x$

Exercise 5 *Find* $\dfrac{d^4 y}{dx^4}$ *(i.e. the fourth order derivative of y) if*

$$y = 2\sin(3x).$$

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