Differential and Integral Calculus 1
MS-A0111
Hakula
Orlich/Ardiyansyah
Home Exam 1, 2020
Student ID: 887799

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NOTE[1]

The due date is published on the course pages. Homework can be submitted only digitally. Instructions on labeling the answer sheets can be found on the course pages.

PROBLEM 1   Find the limit

$$\lim_{x \to 1} \frac{-\frac{31x^6}{1680} + \frac{43x^5}{80} - \frac{97x^4}{16} + \frac{1607x^3}{48} - \frac{1412x^2}{15} + \frac{7469x}{60} - \frac{408}{7}}{\frac{19x^5}{168} - \frac{383x^4}{168} + \frac{2819x^3}{168} - \frac{9385x^2}{168} + \frac{2291x}{28} - \frac{284}{7}}.$$

PROBLEM 2   Find the derivative of

$$f(x) = \sin(\tan(x))$$

at $x = 2\pi$.

PROBLEM 3   Find the derivative of

$$f(x) = \sin(7x)\cos(5x)\tan(3x)$$

at $x = \frac{13\pi}{7}$.

PROBLEM 4   Find the Taylor polynomial of degree 5 of the function

$$f(x) = \cos(\sin(x))$$

about $a = \frac{8\pi}{7}$.

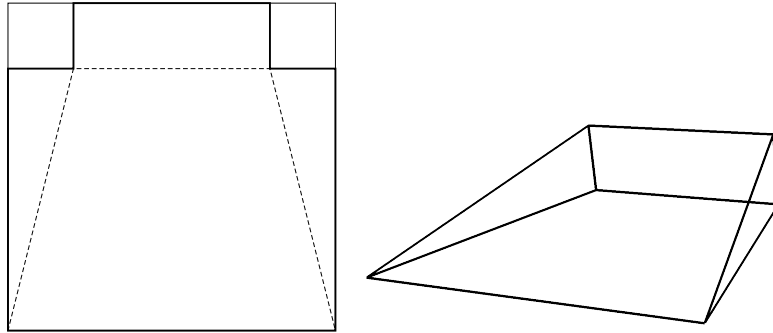[1]Published on 2020-09-30 19:30:12+03:00.

Figure 1: Dustpan design.

PROBLEM 5   Equal squares are cut out of two adjacent coners of a sheet metal having sides of length 7056 units. The three resulting flaps are bent up, as shown in Figure 1, to form the sides of a dustpan. Find the maximum volume of a dustpan made this way.