

Calculus II

MTH232, Spring 2020

MoWe 2:30 - 4:25 PM, Room: 1S 219

Review Assignment #1

1. Compute formulas for the derivatives of the following functions.
 - (a) $f(x) = 5x^2 + 7x - 3$
 - (b) $r(t) = \cos(2t + 3)$
 - (c) $t(x) = e^x \sin x$
 - (d) $g(y) = 2y \sin(2y) \cdot e^y$
2. The function f has domain $(-2, 2)$ and range $(-1, 7)$. What are the domains and ranges of $g(x) = f(2x)$, $h(x) = f(\sqrt{x})$, $k(x) = f^{-1}(x)$ (assuming that the inverse exists!).
3. Evaluate $\lim_{x \rightarrow 0} \frac{(x+2)^2 - 4}{x}$.

Review Assignment #2

1. Compute formulas for the derivatives of the following functions.
 - (a) $f(x) = 5.1x^2 + 7.2x - 3.3$
 - (b) $r(t) = \tan(3t - 3)$
 - (c) $t(x) = e^{2x} \sin y$
 - (d) $g(y) = \cos(\sin y)$
2. Evaluate the following: $\tan \frac{\pi}{3}$, $\sin \frac{\pi}{2}$, $\cos \frac{\pi}{6}$, $\sin(200\pi)$, $\cos(200\pi)$, $\sin(\sin \frac{\pi}{6})$.
3. Evaluate $\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{1 - x}$.

Review Assignment #3

1. Compute formulas for the derivatives of the following functions.

(a) $f(x) = 15x^3 - 2x^2 + 3x + 12x^{-2} - 10x^{-3}$

(b) $r(t) = \cos(2/t)$

(c) $t(x) = e^{x+x^2} \sin(x + x^2)$

(d) $g(y) = (x^2 + x + 1)(2 + 3x + 4x^2)$ (trick question!)

2. Solve the equations:

(a) $\log(e^{3x}) = 10$ (except in calculus textbooks and on high-school calculators, “log” refers to the natural logarithm)

(b) $u^2 - 3u - 4 = 0$

(c) $e^{2x} - 3e^x - 4 = 0$

3. Evaluate $\lim_{x \rightarrow 0} \sqrt{x^2}$.

Review Assignment #4

1. Compute formulas for the derivatives of the following functions.

(a) $f(x) = (2x + 3)^2$

(b) $r(t) = \cos^2(2/t) + \sin^2(2/t)$

(c) $t(x) = \sin(\cos(x + x^2))$

(d) $g(x) = \frac{x^2+x+1}{2+3x+4x^2}$

2. Let $f(x) = 1 + x + x^2 + x^3 + \dots + x^{100}$. Find $f'(1)$.

3. Express $2/7$ as a (repeating) decimal.

Review Assignment #5

1. Compute formulas for the derivatives of the following functions.
 - (a) $f(x) = (2x + 3)^{1/2}$
 - (b) $r(t) = \cos^{2020}(2t)$
 - (c) $t(x) = \exp(x + 1/x)$
 - (d) $g(x) = \log \frac{x^2+x+1}{2+3x+4x^2}$
2. Consider the function defined by $f(x) = Ax^2 + Bx + C$ for real numbers x . What conditions on A, B, C guarantee that f has a minimum? At which x does that minimum occur? What is that minimum? What conditions guarantee a maximum? Where does it happen, and what is that maximum?
3. Find (an equation for) the tangent line to (the graph of) $a(t) = 2t^2 + 3$ at $t = 1$.

Review Assignment #6

1. Compute formulas for the derivatives of the following functions.
 - (a) $f(x) = 3x^{3/2} + \cos(x)^{3/2}$
 - (b) $r(t) = \frac{1}{\sqrt{x}}$
 - (c) $t(x) = \frac{1}{x^2+1}$
 - (d) $g(x) = (x + 1)^{-1}$
2. (Challenging!) The function $f(x) = x^4 - x^3 - x^2 + ax + 1$ has a relative minimum at $x = a$ and $f(a) = a$. Find a .
3. Express $\cos(2x)$ and $\sin(2x)$ in terms of $\cos x$ and $\sin x$.