ACMAT161 Summer 2024
Professor Manguba-Glover
Classwork 19 & 20   Name: _____

Complete as many of the following problems as you can with your table in the allotted time. You do not have to go in order.

Classwork 19

1. Evaluate $\displaystyle\lim_{x\to 1}\frac{\ln x}{x-1}$

2. Evaluate $\displaystyle\lim_{x\to\infty}\frac{e^x}{x^2}$

3. Evaluate $\displaystyle\lim_{x\to\infty}\frac{\ln x}{\sqrt{x}}$

4. Evaluate $\displaystyle\lim_{x\to 0}\frac{\tan x - x}{x^3}$

5. Evaluate $\displaystyle\lim_{x\to 0^+} x\ln x$

6. Evaluate $\displaystyle\lim_{x\to\frac{\pi}{2}^-}\left(x\to\sec x - \tan x\right)$

7. Evaluate $\displaystyle\lim_{x\to\infty} x^{1/x}$

Key:

1. 1

2. ∞

3. 0

4. $\frac{1}{3}$

5. 0

6. 0

7. 1

Classwork 20

1. Use Newton's Method to determine x_2 when $f(x) = x^3 - 7x^2 + 8x - 3$ and $x_0 = 5$

2. Find the solution to $x^4 - 5x^3 + 9x + 3 = 0$ that is in the interval $[4, 6]$

3. Find the most general antiderivative of $f(x) = 3x^2$

4. Find the most general antiderivative of $f(x) = \sin t$

5. Evaluate $\int \left(3x^5 + 2 - 5\sqrt{x} - \frac{1}{x} \right) dx$

6. Evaluate $\int \left(2x + 3\cos x + \frac{e^x}{3} \right) dx$

7. Evaluate $\int \frac{\sin x}{\cos^2 x} dx$

8. Solve the initial value problem: $f'(x) = x^2 - 2x$, $f(1) = \frac{1}{3}$

9. A particle moves in a straight line with acceleration $a(t) = 6t + 4$. Its initial velocity is -6 cm/s and its initial position is at 9 cm. Find the equation for position at time t.

Key:

1. 5.71875

2. 4.52891796

3. $x^3 + C$

4. $-\cos t + C$

5. $\frac{x^6}{2} + 2x - \frac{10}{3}x^{3/2} - \ln|x| + C$

6. $x^2 + 3\sin x + \frac{1}{3}e^x + C$

7. $\sec x + C$

8. $f(x) = \frac{x^3}{3} - x^2 + 1$

9. $s(t) = t^3 + 2t^2 - 6t + 9$