

Math 2315 - Calculus 2

Cumulative Quiz #3 - 2021.03.12

Name: _____

1. Compute the following derivative: $\frac{d}{dx} \tan^{-1}(\sin(3x))$

2. Compute the following integrals:

(a) $\int \frac{w^3}{1+w^8} dw$

(b) $\int \frac{1}{u^2(3+4u)} du$

3. Compute the following limit: $\lim_{x \rightarrow 0} \frac{\tan^{-1}(3x)}{\sin(2x)}$

4. Determine whether the following sequences converge or diverge:

(a) $a_n = \frac{2n^2 \cos(n)}{n^2 + 4}$

(b) $a_n = \frac{2n^2 \cos((2n+1)\pi)}{n^2 + 4}$

(c) $a_n = \frac{2n^2 \cos(1/n)}{n^2 + 4}$

5. Determine whether the following series converge or diverge:

(a) $\sum_{k=1}^{\infty} \frac{\cos(1/k)}{\sqrt{k^3 + 1}}$

(b) $\sum_{k=6}^{\infty} \frac{2k + 3 \cos(2k + 1)}{k^3}$

6. Compute exactly: $\sum_{k=0}^{\infty} 3 \cdot \left(-\frac{2}{3}\right)^k$.