

Final

Find the following anti derivatives. u subs:

1. $\int \frac{\log(x)}{x} dx$

2. $\int x\sqrt{1-x^2} dx$

parts:

1. $\int x^2 \cos(x) dx$

3. $\int e^x \sin(x) dx$

2. $\int x^2 \log(x) dx$

4. $\int \frac{\log(\log(x))}{x} dx$

trig sub:

1. $\int \frac{dx}{\sqrt{x^2-1}}$

2. $\int \sqrt{1-x^2} dx$

Partial fraction etc:

1. $\int \frac{x^4}{x-1} dx$

2. $\int \frac{1+x}{x-x^2} dx$

On you (mostly u-sub of your choice)

1. $\int \frac{1+e^x}{1-e^x} dx$

3. $\int \frac{\sqrt{x+1}}{x-1} dx$

2. $\int \frac{dx}{1+\sqrt{x+1}}$

Compute the improper integrals:

1. $\int_0^9 \frac{dx}{\sqrt{x}}$

2. $\int_0^2 x \log(x) dx$

3. $\int_1^\infty \frac{dx}{x^2}$

1. Find the equation of the tangents to the curve $x = 3t^2 + 1, y = 2t^3 + 1$ that pass through the point $(4, 3)$

2. Find the length of the curve $x = e^t + e^{-t}, y = 5 - 2t$ for $0 \leq t \leq 2$

1. Find the limit of the sequence

$$a_n = \left(1 + \frac{2}{n}\right)^n$$

2. Find the limit of the sequence defined by

$$a_1 = 2, a_{n+1} = 1 - \frac{1}{a_n}$$

3. Find the sum:

$$\sum_{n=0}^{\infty} \frac{2^n + 3^n}{6^n}$$

4. Find the sum:

$$\sum_{n=2}^{\infty} \frac{2}{n^2 - 1}$$

5. Use the ratio test to show the series converges

$$\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!}$$

6. Find the radius of convergence and interval of convergence for

$$\sum_{n=1}^{\infty} \frac{n(x+1)^n}{2^n}$$

7. Find the Maclaurin series for

$$f(x) = \frac{x^2}{1+x}$$

8. Find the Maclaurin series for

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

9. Find the first four terms of the Taylor series for $f(x) = \sqrt{x+1}$ at $x = 3$

10. Find the volume of the solid when $y = x^3$ is rotated about the x axis from $x = 1$ to $x = 4$

11. Find the area enclosed by $r = 2 + 2 \sin(\theta)$