

1. What is the smallest number n that can be used to estimate $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^6}$ with error of 0.0001
2. Solve $xyy' = \ln(x)$ with $y(1) = 2$
3. Find the arc length of $r = 2a \cos(\theta)$. Hint: Remember “ a ” is a constant.
4. Evaluate $\int x \sin(3x) dx$
5. Find the surface area if $x = 4t$, $y = t^3$, $1 \leq t \leq 2$ is revolved about the x-axis.
6. Evaluate $\int \cos^2(4x) dx$
7. Evaluate $\int x\sqrt{x+1} dx$
8. Evaluate $\int \sqrt{-x^2 + 6x} dx$
9. Determine convergence or divergence.

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

(b) $\sum_{n=1}^{\infty} \frac{1}{\sqrt[n]{e}}$

(c) $\sum_{n=1}^{\infty} \frac{3 + \sin(n)}{n^4}$

10. Using Euler’s method, find $y(2.2)$ for $y' = 2x^2 + y^2$ with step size .1, $y(2) = 1$
11. Solve $2y' - y = e^{\frac{x}{2}}$ with $y(0) = 1$
12. Determine if **AC**, **CC** or **D**.

(a) $\sum_{n=1}^{\infty} \frac{(-10)^n}{n!}$

(b) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n5^n}$

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

13. **Set up only** the length of the curve $y = \tan(x)$ on $a \leq x \leq b$.

ANSWERS

1) 4 terms

2) $y^2 = (\ln x)^2 + 4$

3) $2a\pi$

4) $-\frac{x}{3} \cos(3x) + \frac{1}{9} \sin(3x) + C$

5) $\frac{\pi}{27} (160^{3/2} - 25^{3/2})$

6) $\frac{x}{2} + \frac{1}{16} \sin(8x) + C$

7) $\frac{2}{5}(x+1)^{5/2} - \frac{2}{3}(x+1)^{3/2} + C$

8) $\frac{9}{2} \sin^{-1} \left(\frac{x-3}{3} \right) + \frac{9}{2} \left(\frac{x-3}{3} \right) \left(\frac{\sqrt{9 - (x-3)^2}}{3} \right) + C$

9a) Converges

9b) Diverges

9c) Converges

10)

n	x_n	y_n
0	2	1
1	2.1	1.9
2	2.2	3.143

11) $y = \frac{x}{2} e^{x/2} + e^{x/2}$

12a) AC

12b) AC

12c) Divergent

13) $\int_a^b \sqrt{1 + \sec^4(x)} dx$