

MA17300 Final Exam

Practice Test 1

Find the volume of the solid generated by revolving the region about the given axis. Use the shell or washer method.

- 1) The region bounded by $y = 4x - x^2$ and $y = x$ about the y -axis

Find the length of the curve.

- 2) $x = 3 \sin t + 3t$, $y = 3 \cos t$, $0 \leq t \leq \pi$

Solve the problem.

- 3) Find the area between $y = (x - 2)e^x$ and the x -axis from $x = 2$ to $x = 6$.

Integrate the function.

4) $\int \frac{x^3}{\sqrt{x^2 + 8}} dx$

Evaluate the integral.

5) $\int_0^{\pi/2} \cos^2 2x \sin^3 2x dx$

Express the integrand as a sum of partial fractions and evaluate the integral.

6) $\int \frac{4x^3 - 5x^2 + 8x - 10}{(x^2 + 2)(x - 2)^3} dx$

Find the Taylor series generated by f at $x = a$.

7) $f(x) = \frac{1}{x^2}$, $a = 9$

Use the root test to determine if the series converges or diverges.

8) $\sum_{n=1}^{\infty} \frac{(n!)^n}{(n^n)^6}$

Find the area of the specified region.

- 9) Shared by the cardioids $r = 9(1 + \sin \theta)$ and $r = 9(1 - \sin \theta)$

Answer Key

Testname: FEPRAC1

1) $\frac{27}{2}\pi$

2) 12

3) $3e^6 + e^2$

4) $\frac{1}{3}(x^2+8)^{3/2} - 8\sqrt{x^2+8} + C$

5) $\frac{2}{5}$

6) $-\frac{4}{x-2} - \frac{3}{2(x-2)^2} + C$

7) $\sum_{n=0}^{\infty} \frac{(-1)^n (n+1)(x-9)^n}{9^{n+2}}$

8) Diverges

9) $\frac{81}{2}(3\pi - 8)$