

MA17300 Final Exam

Practice Test 2

Integrate the function.

1) $\int \frac{40 \, dx}{x^2 \sqrt{x^2 + 64}}$

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

2) $\int_0^1 \frac{x^3}{x^2 + 12x + 36} \, dx$

Evaluate the integral by using a substitution prior to integration by parts.

3) $\int (\ln 9x)^2 \, dx$

For what values of x does the series converge absolutely?

4) $\sum_{n=2}^{\infty} \frac{x^n}{n(\ln n)^5}$

Use the limit comparison test to determine if the series converges or diverges.

5) $\sum_{n=2}^{\infty} \frac{1}{3 + 5n \ln \ln n}$

Solve the problem.

- 6) A swimming pool has a rectangular base 14 ft long and 28 ft wide. The sides are 6 ft high, and the pool is half full of water. How much work will it take to empty the pool by pumping the water out over the top of the pool? Assume that the water weighs 62.4 lb/ft^3 . Give your answer to the nearest $\text{ft} \cdot \text{lb}$.

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

- 7) The region bounded by $y = 7x - x^2$ and $y = x$ about the line $x = 6$

Find the length of the curve.

8) $x = e^t - 5t, y = 4\sqrt{5}e^{t/2}, 0 \leq t \leq 1$

Find the area of the specified region.

- 9) Inside the outer loop and outside the inner loop of the limaçon $r = 6 \cos \theta - 3$

Answer Key

Testname: FEPRAC2

1) $-\frac{5\sqrt{x^2+64}}{8x} + C$

2) $108\ln\left(\frac{7}{6}\right) - \frac{233}{14}$

3) $x(\ln 9x)^2 - 2x(\ln 9x) + 2x + C$

4) $-1 \leq x \leq 1$

5) Diverges

6) 330,221 ft · lb

7) 216π

8) $e + 4$

9) $9(\pi + 3\sqrt{3})$