

MA 126, CALCULUS II  
Spring, 2016

Name (Print last name first): .....

Student Signature: .....

**FINAL EXAM**

**15 questions, 7 points each. SHOW ALL YOUR WORK!**

Question 1

a) Evaluate the integral  $\int_2^{17} (x - 1)^{1/4} dx$ .

b) Calculate the derivative of  $y = \ln(\tan^{-1}(x))$ .

Question 2

Evaluate the integral  $\int x e^{-3x} dx$ .

Question 3

Evaluate the integral  $\int (\sin(x))^4 \cos(x) dx$ .

Question 4

Evaluate the integral

$$\int x^4 \ln(x^5) dx$$

Question 5

Evaluate the improper integral

$$\int_e^\infty \frac{1}{x(\ln(x))^3} dx$$

Question 6

Find the area of the region bounded by the parabola  $y = x^2 + 4x$  and the line  $y = -x$ .

Question 7

Determine whether the series is absolutely convergent, conditionally convergent or divergent.

a)

$$\sum_{n=1}^{\infty} \frac{n}{n^2 + n^3}.$$

b)

$$\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln(n)}.$$

Question 8

Determine whether the series is convergent or divergent.

a)

$$\sum_{n=1}^{\infty} n! \left(\frac{1}{4}\right)^n.$$

b)

$$\sum_{n=1}^{\infty} \frac{n^4}{n!}.$$

Question 9

Find the radius and interval of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{4^n (x-1)^n}{n}.$$

Question 10

Express the function

$$f(x) = \frac{1}{x^2 - 3x + 2}$$

as the power series.

Question 11

Let  $\mathbf{r}(t) = (t, t^2, 2t - 1)$ . Find SYMMETRIC equation of the tangent line at point  $t = 2$ .

Question 12

Find the area of the triangle with vertices  $(1, -1, 1)$ ,  $(1, 1, 1)$  and  $(-2, 1, 2)$ .

Question 13

Find equation of the plane containing the points  $(0, -1, 1)$ ,  $(-1, 1, -2)$  and  $(-1, 1, 1)$ .

Question 14

Find parametric equation of the line which passes through the point  $(1, -1, -1)$  and is orthogonal to the vectors  $\mathbf{i} - \mathbf{j}$  and  $\mathbf{i} + \mathbf{k}$ .

Question 15

A particle moves with acceleration  $\mathbf{a}(t) = (e^{-t}, 1, t)$ . Find velocity and position function if the initial data are  $\mathbf{v}(0) = (1, 0, 1)$ ,  $\mathbf{r}(0) = (0, 1, 1)$ .



SCRATCH PAPER