

MATH 155 - Practice Exam #1

Dr. Nakamura

Name: _____

Show all of your work to receive any credit. If I cannot read your writing or follow your work, you will NOT receive any credit for the problem.

1. $\int \cos^3 2x \sin^2 2x \, dx$

2. $\int \frac{\sqrt{9-x^2}}{x^2} \, dx$

3. $\int \frac{x^3 - x + 3}{x^2 + x - 2} \, dx$

4. $\int e^{2x} \cos 3x \, dx$

5. $\int \frac{6x^2 - 3x + 14}{x^3 - 2x^2 + 4x - 8} \, dx$

6. $\int_0^5 \frac{dx}{\sqrt{25-x^2}}$

7. $\int x^2 \cos x \, dx$

8. $\int (\sin 5x + \cos 5x)^2 \, dx$

9. $\int_0^{1/2} \cos^{-1} x \, dx$

10. $\int \frac{4}{3e^x - 2} \, dx$

11. $\int \frac{dx}{\sqrt{1-4x-x^2}}$

12. $\int_0^1 \ln(1+x^2) \, dx$

13. $\int \frac{1}{x^2 \sqrt{x^2+4}} \, dx$

14. $\int \frac{x^2+5}{x^3-x^2+x+3} \, dx$

15. $\int_0^{\sqrt{3}/2} \frac{1}{(1-x^2)^{5/2}} \, dx$

16. Find the limit. $\lim_{x \rightarrow 0^+} \frac{e^x - (1+x)}{x^3}$

17. Find the limit. $\lim_{x \rightarrow \infty} \frac{e^{x/2}}{x}$

18. Find the limit. $\lim_{x \rightarrow 0} (e^x + x)^{1/x}$

19. Determine whether the improper integral diverges or converges. Evaluate the integral if it converges.

$$\int_4^{\infty} \frac{dx}{x(\ln x)^3}$$

20. Determine whether the improper integral diverges or converges. Evaluate the integral if it converges.

$$\int_2^4 \frac{dx}{\sqrt{x^2 - 4}}$$

Note: Go over more Improper Integral problems from your homework.

Integrate the following.

21. $\int \frac{dx}{(x-2)\sqrt{x^2 - 4x + 3}}$

22. $\int \frac{dy}{\sqrt{e^{2y} - 1}}$

23. $\int \frac{2^{\ln x}}{x} dx$

24. $\int (\sin 3x \cos 2x - \cos 3x \sin 2x) dx$

25. $\int_{\sqrt{2}}^3 \frac{2x^3}{x^2 - 1} dx$

26. $\int_0^{\pi/4} \frac{1 + \sin x}{\cos^2 x} dx$

27. $\int \ln(x + x^2) dx$

28. $\int \frac{9x^3 - 3x + 1}{x^3 - x^2} dx$