Study Guide Math 182 Test 2
Sections 7.1-7.4, 7.8, 9.3

Study these problems as well as your quizzes .

Evaluate the integral.

1) $\int -3x \cos 2x \, dx$

2) $\int 9xe^x \, dx$

3) $\int x^2 \ln 7x \, dx$

4) $\int_0^{\pi/6} \sin^3 3x \, dx$

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

6) $\int 8 \sec^4 x \, dx$

7) $\int_0^1 \frac{dx}{\sqrt{16 - x^2}}$

8) $\int \frac{\sqrt{x^2 + 25}}{9x^2} \, dx$

9) $\int_{-1}^1 \frac{8}{1 + 64t^2} \, dt$

10) $\int \frac{\sqrt{x^2 - 36}}{x} \, dx$

11) $\int \sqrt{16 - x^2} \, dx$

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

12) $\int \frac{5x + 47}{x^2 + 8x + 7} \, dx$

13) $\int \frac{x + 8}{x^2 + 6x}\, dx$

14) $\int \frac{40}{t^3 + 3t^2 - 4t} dt$

15) $\int_0^1 \frac{x^3}{x^2 + 6x + 9} dx$

16) $\int \frac{dx}{x^2(x^2 - 25)}$

17) $\int \frac{2x^2 + x + 5}{(x^2 + 7)(x - 9)}\, dx$

18) $\int \frac{5x^4 + 48x^2 + 108}{x(x^2 + 6)^2}\, dx$

Evaluate the improper integral or state that it is divergent.

19) $\int_1^\infty \frac{22}{8x(x + 1)^2}\, dx$

20) $\int_0^\infty \frac{2dx}{25 + x^2}$

21) $\int_{-\infty}^\infty 4xe^{-x}\, dx$

22) $\int_0^4 \frac{dx}{\sqrt{4 - x}}$

23) $\int_{-27}^1 \frac{dx}{x^{2/3}}$

24) $\int_0^2 x \ln 2x\, dx$

Determine whether the improper integral converges or diverges.

25) $\int_0^{\pi/2} \frac{\sin \sqrt{t}}{\sqrt{t}}\, dt$

26) $\int_1^{\infty} \frac{\ln |x|}{x} dx$

Solve the differential equation.

27) $\frac{dy}{dx} = e^{5x - 5y}$

28) $\frac{dy}{dx} = 12\sqrt{xy}$

29) $\frac{dy}{dx} = 6x^5 \sec y$

30) $\frac{dy}{dx} = 7x^6\sqrt{y - 1}$

Answer Key
Testname: T2SG

1) $-\frac{3}{4}\cos 2x - \frac{3}{2}x\sin 2x + C$

2) $9xe^x - 9e^x + C$

3) $\frac{1}{3}x^3 \ln 7x - \frac{1}{9}x^3 + C$

4) $-\frac{1}{9}$

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

6) $8\tan x + \frac{8}{3}\tan^3 x + C$

7) $\sin^{-1}\frac{1}{4}$

8) $\frac{1}{9}\ln\left|\sqrt{x^2+25} + x\right| - \frac{\sqrt{x^2+25}}{9x} + C$

9) $2\tan^{-1} 8$

10) $6\left[\frac{\sqrt{x^2-36}}{6} - \sec^{-1}\left(\frac{x}{6}\right)\right] + C$

11) $8\sin^{-1}\left(\frac{x}{4}\right) + \frac{x\sqrt{16-x^2}}{2} + C$

12) $\ln\left|\frac{(x+1)^7}{(x+7)^2}\right| + C$

13) $\frac{1}{6}\ln\left|\frac{x^8}{(x+6)^2}\right| + C$

14) $-10\ln|t| + 8\ln|t-1| + 2\ln|t+4| + C$

15) $27\ln\left(\frac{4}{3}\right) - \frac{31}{4}$

16) $\frac{1}{25x} + \frac{1}{250}\ln\left|\frac{x-5}{x+5}\right| + C$

17) $2\ln|x-9| + \frac{\sqrt{7}}{7}\tan^{-1}\left(\frac{x\sqrt{7}}{7}\right) + C$

18) $3\ln|x| + \ln\left|x^2+6\right| + C$

19) 0.530

20) $\frac{\pi}{5}$

21) Divergent

22) 4

23) 12

24) $2\ln 4 - 1$

25) Converges

26) Diverges

27) $y = \frac{1}{5}\ln(e^{5x} + C)$

28) $y = (4x^{3/2} + C)^2$

29) $y = \sin^{-1}(x^6 + C)$

30) $y = \left(\frac{1}{2}x^7 + C\right)^2 + 1$