Calculus –2

Test –1   Name_____

Review

Evaluate the integral.

1) $\displaystyle\int e^{2x} x^2 \, dx$

2) $\displaystyle\int (5x + 3)\, e^{-2x} \, dx$

3) $\displaystyle\int \frac{9 \, dx}{\sqrt{9 - 81x^2}}$

4) $\displaystyle\int \frac{\ln x^5}{x} \, dx$

5) $\displaystyle\int \frac{(\sin^{-1} x)^4}{\sqrt{1 - x^2}} \, dx$

6) $\displaystyle\int_{1}^{\sqrt{2}} x 9^{x^2} \, dx$

7) $\displaystyle\int \frac{\cot^3 x}{2} \, dx$

8) $\displaystyle\int 8 \cos^3 2x \, dx$

9) $\displaystyle\int_{-\pi/16}^{\pi/16} \tan^4 4t \, dt$

10) $\displaystyle\int_{0}^{1/4} 5 \sin^4 2\pi x \, dx$

11) $\displaystyle\int_{-\pi/9}^{\pi/9} \sec^3 3x \, dx$

12) $\displaystyle\int \frac{e^t \, dt}{e^{2t} - 10 e^t + 21}$

Integrate the function.

13) $\int \dfrac{44\,dx}{x^2\sqrt{x^2+16}}$

14) $\displaystyle\int_0^1 \dfrac{dx}{\sqrt{16-x^2}}$

15) $\int \dfrac{\sqrt{x^2+9}}{2x^2}\,dx$

16) $\int \dfrac{dx}{x\sqrt{36x^2-64}}$

Use a trigonometric substitution to evaluate the integral.

17) $\int \dfrac{dx}{x\,(1+64\,\ln^2 x)}$

18) $\displaystyle\int_0^1 \dfrac{e^x\,dx}{9-e^{2x}}$

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

19) $\int \dfrac{5x+16}{x^3+4x^2+4x}\,dx$

20) $\int \dfrac{dx}{x^2(x^2-25)}$

21) $\int \dfrac{2x^2+x+10}{(x^2+7)(x-4)}\,dx$

Evaluate the improper integral or state that it is divergent.

22) $\displaystyle\int_6^\infty \dfrac{dx}{x^2-25}$

23) $\displaystyle\int_0^\infty \dfrac{36(1+\tan^{-1}x)}{1+x^2}\,dx$

Evaluate the improper integral.

24) $\displaystyle\int_0^6 \dfrac{dx}{\sqrt{36-x^2}}$

1) $(1/2)x^2e^{2x} - (1/2)xe^{2x} + (1/4)e^{2x} + C$

2) $-\dfrac{5}{2}x\,e^{-2x} - \dfrac{11}{4}e^{-2x} + C$

3) $\sin^{-1}(3x) + C$

4) $\dfrac{1}{10}(\ln x^5)^2 + C$

5) $\dfrac{(\sin^{-1} x)^5}{5} + C$

6) $\dfrac{36}{\ln 9}$

7) $-\dfrac{1}{4}\cot^2 x - \dfrac{1}{2}\ln |\sin x| + C$

8) $4\sin 2x - \dfrac{4}{3}\sin^3 2x + C$

9) $\dfrac{\pi}{8} - \dfrac{1}{3}$

10) $\dfrac{15}{32}$

11) $\dfrac{2\sqrt{3}}{3} + \dfrac{1}{6}\ln(7 + 4\sqrt{3})$

12) $\dfrac{1}{4}\ln |e^t - 7| - \dfrac{1}{4}\ln |e^t - 3| + C$

13) $-\dfrac{11\sqrt{x^2 + 16}}{4x} + C$

14) $\sin^{-1}\dfrac{1}{4}$

15) $\dfrac{1}{2}\ln \left| \sqrt{x^2 + 9} + x \right| - \dfrac{\sqrt{x^2 + 9}}{2x} + C$

16) $\dfrac{1}{8}\sec^{-1}\dfrac{3}{4}x + C$

17) $\dfrac{1}{8}\tan^{-1}(8\ln x) + C$

18) 0.386

19) $4\ln \left| \dfrac{x}{x + 2} \right| + \dfrac{3}{x + 2} + C$

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

21) $2\ln |x - 4| + \dfrac{\sqrt{7}}{7}\tan^{-1}\left(\dfrac{x\sqrt{7}}{7} \right) + C$

22) $\dfrac{1}{10}\ln 11$

23) $18\pi\left(1 + \dfrac{\pi}{4} \right)$

24) $\dfrac{\pi}{2}$