

CALC 2 TEST 2 BONUS REVIEW

G.BUTHUSIEM

Evaluate the integral.

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

2. $\int_0^{\infty} e^{-x} \cos 5x \, dx$

3. $\int x^4 \ln 4x \, dx$

4. $\int (2x-1) \ln(3x) \, dx$

5. $\int 6 \cos^3 4x \, dx$

6. $\int 6 \cos^4 4x \, dx$

7. $\int_0^{\pi/2} \cos^2 8x \sin^3 8x \, dx$

8. $\int \tan^5 3x \, dx$

Integrate the function.

9. $\int \frac{\sqrt{x^2 + 81}}{8x^2} \, dx$

10. $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}, x > 3$

11. $\int \frac{1}{t^2 \sqrt{8 - t^2}} \, dt$

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

12. $\int \frac{8x - 8}{x^2 - 2x - 3} \, dx$

13. $\int \frac{8x + 27}{x^3 + 6x^2 + 9x} \, dx$

$$14. \int \frac{7x^2 + x + 54}{x^3 + 9x} dx$$

Use l'Hopital's Rule to evaluate the limit.

$$15. \lim_{x \rightarrow -9} \frac{x^2 - 81}{x + 9}$$

$$16. \lim_{x \rightarrow 0} \frac{x}{\sin x}$$

Find the limit.

$$17. \lim_{x \rightarrow \infty} (\ln x)^{4/x}$$

Use l'Hopital's rule to find the limit.

$$18. \lim_{x \rightarrow \infty} x \sin \frac{20}{x}$$

Evaluate the improper integral or state that it is divergent.

$$19. \int_6^{\infty} \frac{dx}{x^2 - 25}$$

$$20. \int_{-\infty}^{-5} \frac{9}{x^4} dx$$

$$21. \int_{-\infty}^{\infty} x^5 e^{-x^6} dx$$

$$22. \int_0^{\infty} 8xe^{2x} dx$$

Evaluate the improper integral.

$$23. \int_0^1 \frac{dx}{\sqrt{1-x}}$$

$$24. \int_{-8}^1 \frac{dx}{x^{2/3}}$$

Answer Key

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1. $\frac{1}{2}x^3 \sin 2x + \frac{3}{4}x^2 \cos 2x - \frac{3}{4}x \sin 2x - \frac{3}{8} \cos 2x + C$

2. $\frac{1}{26}$

3. $\frac{1}{5}x^5 \ln 4x - \frac{1}{25}x^5 + C$

4. $(x^2 - x)\ln 3x - \frac{x^2}{2} + x + C$

5. $\frac{3}{2} \sin 4x - \frac{1}{2} \sin^3 4x + C$

6. $\frac{9}{4}x + \frac{3}{8} \sin 8x + \frac{3}{64} \sin 16x + C$

7. 0

8. $\frac{1}{12} \tan^4 3x - \frac{1}{6} \tan^2 3x - \frac{1}{3} \ln |\cos x| + C$

9. $\frac{1}{8} \ln |\sqrt{x^2 + 81} + x| - \frac{\sqrt{x^2 + 81}}{8x} + C$

10. $\frac{1}{9x} + C$

11. $-\frac{\sqrt{8-t^2}}{8t} + C$

12. $4\ln|x-3| + 4\ln|x+1| + C$

13. $3 \ln \left| \frac{x}{x+3} \right| + \frac{1}{x+3} + C$

14. $6 \ln|x| + \frac{1}{2} \ln|x^2+9| + \frac{1}{3} \tan^{-1}\left(\frac{x}{3}\right) + C$

15. -18

16. 1

17. 1

18. 20

19. $\frac{1}{10} \ln 11$

20. $\frac{3}{125}$

21. 0

22. Divergent

23. 2

24. 9