

Review from First and Second Semester Calculus

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1-6 State the definition for each of the following

1. The function $f(x)$ is continuous at c
3. The derivative of $f(x)$ with respect to x in terms of a limit:
4. The definite integral of $f(x)$ on $[a,b]$ in terms of a limit:
5. The indefinite integral of $f(x)$:

6. $\ln(x)$ in terms of an integral:

$$\ln(x) =$$

7. The average of $f(x)$ on the interval $[a,b]$:

8. State the Fundamental Theorem of Calculus:

9. If $y = f(x)$ then

$$dy =$$

10. If $y = f(x)$ then the standard linearization of y at $x=a$ is the tangent line function:

$$L(x) =$$

$$11. \int x^n dx =$$

$$12. \int \sin(x) dx =$$

$$13. \int \cos(x) dx =$$

$$14. \int \frac{1}{x} dx =$$

$$15. \int e^x dx =$$

$$16. \frac{d}{dx} x^n =$$

$$17. \frac{d}{dx} \sin(x) =$$

$$18. \frac{d}{dx} \cos(x) =$$

$$19. \frac{d}{dx} \tan(x) =$$

$$20. \frac{d}{dx} \sec(x) =$$

$$21. \frac{d}{dx} \ln(x) =$$

$$22. \frac{d}{dx} e^x =$$

$$23. d(y^n) =$$

$$24. d(\sin(\theta)) =$$

$$25. d(\cos(z)) =$$

$$26. d(\tan(\psi)) =$$

$$27. d(\sec(x)) =$$

$$28. d(\ln(u)) =$$

$$29. d(e^x) =$$

$$30. d(3\pi^2) =$$

31-35 Integrate the following:

31. $\int \tan^3(x) \sec^2(x) dx$

32. $\int (\sin^3(x) + 1) \cos(x) dx$

33. $\int \frac{t^2 + 2t + 1}{\sqrt{t + 2}} dt$

34. $\int e^{\sin(x)} \cos(x) dx$

35. $\int_1^2 \frac{2x + 1}{x^2 + x} dx$

36-40 Simplify the differentials:

36. $d(uv) =$

37. $d(u/v) =$

38. $d(r \cos(\theta)) =$

39. $d(f(\theta) \cos(\theta)) =$

40. $d(xy + yz + xz) =$

41-45 Convert to polar coordinates and simplify:

41. $y = x$ in polar coordinates:

42. $x = 1$ in polar coordinates:

43. $(x-1)^2 + y^2 = 1$ in polar coordinates:

44. y/x in polar coordinates:

45. dy/dx in polar coordinates: