Lista de ejercicios de la lección 2.2

Integrales Impropias

Instrucciones. Determinar si la integral converge o diverge, si converge calcule su valor.

1. $\int_0^\infty \frac{x}{(1+x^2)^2}\,dx$
2. $\int_0^\infty \frac{x}{1+x^2}\,dx$
3. $\int_4^\infty \frac{x+18}{x^2+x-12}\,dx$
4. $\int_3^\infty \frac{1}{x^2-1}\,dx$
5. $\int_0^\infty \frac{1}{\sqrt[3]{x+1}}\,dx$
6. $\int_{-\infty}^0 \frac{dx}{(x-1)^3}$
7. $\int_{-\infty}^2 \frac{1}{x^2+4}\,dx$
8. $\int_{-\infty}^0 \frac{1}{x^2-3x+2}\,dx$
9. $\int_{-\infty}^\infty \frac{x\,dx}{x^4+9}$
10. $\int_{-\infty}^\infty \frac{2x}{(x^2+1)^2}\,dx$
11. $\int_{-\infty}^\infty \frac{x}{(x^2+9)^{\frac{3}{2}}}\,dx$
12. $\int_1^\infty \left(\frac{1}{x}-\frac{1}{x+1}\right)dx$
13. $\int_0^\infty \frac{dx}{(1+x^2)\,(1+\tan^{-1}x)}$
14. $\int_0^\infty \ln x\,dx$
15. $\int_1^\infty \frac{\ln x}{x}\,dx$
16. $\int_4^\infty \frac{1}{x\,(\ln x)^3}dx$
17. $\int_{-\infty}^0 e^x\,dx$
18. $\int_0^\infty \frac{1}{e^x+e^{-x}}\,dx$
19. $\int_0^\infty \frac{e^x}{e^x+1}\,dx$
20. $\int_{-\infty}^\infty \frac{e^x\,dx}{e^{2x}+1}$
21. $\int_0^\infty xe^{-x}\,dx$
22. $\int_0^\infty x^2e^{-x}\,dx$
23. $\int_{-\infty}^\infty xe^{-x^2}\,dx$
24. $\int_{-\infty}^{\frac{\pi}{2}} \sin(2x)\,dx$
25. $\int_0^\infty e^{-x}\cos x\,dx$
26. $\int_0^\infty e^{-2x}\sin(3x)\,dx$
27. $\int_{-\infty}^\infty sech(x)\,dx$

Determine si las integrales dadas convergen o divergen.

28. $\int_0^2 \frac{dx}{1-x}$
29. $\int_{-2}^1 \frac{dx}{(x+1)^3}$
35. $\int_0^1 \frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$
36. $\int_0^1 -\ln x\,dx$
42. $\int_0^\infty \frac{1}{\sqrt{x}(1+x)}\,dx$
43. $\int_0^\infty \frac{4}{\sqrt{x}(x+6)}\,dx$

30. $\int_{-3}^{3} \frac{dx}{x^2 - x - 2}$

31. $\int_{0}^{4} \frac{1}{x^2 - 4x + 3}\, dx$

32. $\int_{-2}^{-1} \frac{1}{(x+2)^{\frac{5}{4}}}\, dx$

33. $\int_{-2}^{3} \frac{x\, dx}{\sqrt{x^2 - 4}}$

34. $\int_{-2}^{2} \frac{x}{x^2 - 1}\, dx$

37. $\int_{\frac{1}{e}}^{e} \frac{1}{x(\ln x)^2}\, dx$

38. $\int_{0}^{\frac{\pi}{2}} sec^2 x\, dx$

39. $\int_{0}^{\frac{\pi}{2}} \tan^2 x\, dx$

40. $\int_{\frac{\pi}{2}}^{\pi} \frac{1}{1 - cosx}\, dx$

41. $\int_{-1}^{\infty} \frac{dx}{x^2 + 5x + 6}$

44. $\int_{2}^{\infty} \frac{1}{x\sqrt{x^2 - 4}}\, dx$

45. $\int_{5}^{\infty} \frac{1}{x\sqrt{x^2 - 25}}\, dx$

46. $\int_{-1}^{1} \ln|x|\, dx$

47. $\int_{1}^{\infty} \frac{1}{x \ln x}\, dx$

48. $\int_{-\infty}^{-2} \frac{2\, dx}{x^2 - 1}$