Section 7.8 – Improper Integrals

Evaluate the integrals that converge.

3. $\int_0^\infty e^{-2x}dx$

7. $\int_e^\infty \frac{1}{x\ln^3 x}dx$

11. $\int_{-\infty}^0 e^{3x}dx$

13. $\int_{-\infty}^\infty x\,dx$

17. $\int_0^4 \frac{dx}{(x-4)^2}$

19. $\int_0^{\pi/2} \tan x\,dx$

23. $\int_{\pi/3}^{\pi/2} \frac{\sin x}{\sqrt{1-2\cos x}}dx$

27. $\int_{-1}^8 x^{-1/3}dx$

Make the *u*-substitution and evaluate the resulting definite integral.

37. $\int_0^\infty \frac{e^{-\sqrt{x}}}{\sqrt{x}}dx\,;\ u=\sqrt{x}$

39. $\int_0^\infty \frac{e^{-x}}{\sqrt{1-e^{-x}}}dx\,;\ u=1-e^{-x}$

55. Let R be the region to the right of $x=1$ that is bounded by the *x*-axis and the curve $y=\frac{1}{x}$. When this region is revolved about the *x*-axis it generates a solid whose surface is known as **Gabriel's Horn**. Show that the solid has a finite volume but its surface has an infinite area.