Stewart Calculus ET 5e 0534393217;5. Integrals; 5.2 The Definite Integral

16. $\int_0^2 e^{-x^2}\,dx$ with $n=5$, 10 , 50 , and 100 .

n	L_n	R_n
5	1.077467	0.684794
10	0.980007	0.783670
50	0.901705	0.862438
100	0.891896	0.872262

The value of the integral lies between 0.872 and 0.892 . Note that $f(x)=e^{-x^2}$ is decreasing on $(0,2)$. We cannot make a similar statement for $\int_{-1}^2 e^{-x^2}\,dx$ since f is increasing on $(-1,0)$.

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62. $\lim_{n\to\infty} \frac{1}{n}\left(\sqrt{\frac{1}{n}}+\sqrt{\frac{2}{n}}+\cdots+\sqrt{\frac{n}{n}}\right)=\lim_{n\to\infty}\frac{1-0}{n}\sum_{i=1}^{n}\sqrt{\frac{i}{n}}=\int_0^1\sqrt{x}\,dx=\left[\frac{2x^{3/2}}{3}\right]_0^1=\frac{2}{3}-0=\frac{2}{3}$

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61. From the Net Change Theorem, the increase in cost if the production level is raised from 2000 yards to 4000 yards is $C(4000)-C(2000)=\int_{2000}^{4000}C'(x)\,dx$.

$$\int_{2000}^{4000}C'(x)\,dx = \int_{2000}^{4000}\left(3-0.01x+0.000006x^2\right)dx$$

$$= \left[3x-0.005x^2+0.000002x^3\right]_{2000}^{4000}=60{,}000-2{,}000=\$58{,}000$$