Type the function, the variable of integration x, the lower limit, the upper limit, a right parenthesis, and enter. The four items within the parentheses must be separated by commas. (**Note:** You may use any number for the upper limit; for this function 100 works well.)

The calculator will return Ø.Ø442551719, a more accurate answer than the result from Method 1 (see Figure 7).

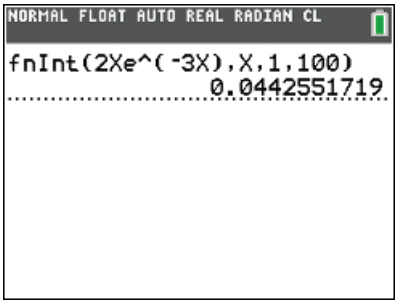

FIGURE 7

7.4 EXERCISES

PRACTICE

In Exercises 1–10, find the limit if it exists.

1. $\lim\limits_{b\to+\infty}\dfrac{1}{b}$

2. $\lim\limits_{b\to+\infty}\dfrac{1}{\sqrt[3]{b}}$

3. $\lim\limits_{b\to+\infty}\dfrac{\sqrt{b}}{20}$

4. $\lim\limits_{b\to+\infty} e^{0.1b}$

5. $\lim\limits_{b\to+\infty} e^{-4b}$

6. $\lim\limits_{b\to+\infty}\left(-12\ln b\right)$

7. $\lim\limits_{b\to+\infty}\left(2+\dfrac{9}{\sqrt{3b+1}}\right)$

8. $\lim\limits_{b\to+\infty}\left(5+e^{-2b}\right)$

9. $\lim\limits_{b\to+\infty}\left(7b^4e^{-b}\right)$

10. $\lim\limits_{b\to+\infty}\left(7b+2\right)^{-\frac{2}{3}}$

In Exercises 11–34, determine whether the improper integrals are convergent or divergent, and evaluate those that are convergent.

11. $\int_2^{+\infty}\dfrac{4}{x^3}dx$

12. $\int_1^{+\infty}\dfrac{1}{\sqrt[3]{x}}dx$

13. $\int_8^{+\infty} x^{-\frac{2}{3}}dx$

14. $\int_4^{+\infty} 5x^{-\frac{3}{2}}dx$

15. $\int_{20}^{+\infty} 3e^{-x}dx$

16. $\int_4^{+\infty} e^{-2x}dx$

17. $\int_2^{+\infty} e^{-\frac{x}{3}}dx$

18. $\int_2^{+\infty} 4e^{-0.5x}dx$

19. $\int_2^{+\infty} e^{1.5x}dx$

20. $\int_{-1}^{+\infty}\dfrac{1}{80}e^{0.16x}dx$

21. $\int_0^{+\infty}\dfrac{1}{(x+3)^2}dx$

22. $\int_0^{+\infty}\dfrac{4}{\sqrt{3x+1}}dx$

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23. $\int_{-1}^{+\infty} \frac{2}{\sqrt[3]{2x+3}}\,dx$

24. $\int_{2}^{+\infty} (3x+2)^{-\frac{4}{3}}\,dx$

25. $\int_{0}^{+\infty} \frac{5}{x+1}\,dx$

26. $\int_{0}^{+\infty} (5x+4)^{-\frac{3}{2}}\,dx$

27. $\int_{0}^{+\infty} x^2 e^{-x^3}\,dx$

28. $\int_{0}^{+\infty} -4xe^{x^2}\,dx$

29. $\int_{1}^{+\infty} xe^{1-x^2}\,dx$

30. $\int_{0}^{+\infty} 7xe^{-x^2}\,dx$

31. $\int_{2}^{+\infty} \frac{1}{x(\ln x)^3}\,dx$

32. $\int_{e}^{+\infty} \frac{1}{x \ln x}\,dx$

33. $\int_{0}^{+\infty} xe^{-x}\,dx$

34. $\int_{0}^{+\infty} xe^{-0.2x}\,dx$

In Exercises 35–38, find the area, if it exists, of the region under the curve $y = f(x)$ on the given interval of the x-axis.

35. $f(x) = \frac{4}{x^2},\ x \geq 2$

36. $f(x) = 3e^{-x},\ x \geq 0$

37. $f(x) = \frac{3}{x},\ x \geq 6$

38. $f(x) = 2e^{0.8x},\ x \geq 0$

WRITING & THINKING

39. The integral $\int_{1}^{+\infty} \frac{1}{x^p}\,dx$ converges if and only if (choose all that apply):

a. $0 < p < 1$
b. $p \neq 1$
c. p is an integer greater than or equal to 2
d. $p > 1$
e. p is positive
f. none of the above

TECHNOLOGY

40. Integrate $\int_{1}^{+\infty} 2xe^{-3x}\,dx$ by evaluating the limit and compare your answer to the calculator values obtained at the end of the section.

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