

p. 523 #57-62 answers

- 57.** Because  $\frac{1}{x^2 + 5} \leq \frac{1}{x^2}$  on  $[1, \infty)$  and  $\int_1^\infty \frac{1}{x^2} dx$  converges by Exercise 49,  $\int_1^\infty \frac{1}{x^2 + 5} dx$  converges.

- 58.** Because  $\frac{1}{\sqrt{x-1}} \geq \frac{1}{x}$  on  $[2, \infty)$  and  $\int_2^\infty \frac{1}{x} dx$  diverges by Exercise 55,  $\int_2^\infty \frac{1}{\sqrt{x-1}} dx$  diverges.

- 59.** Because  $\frac{1}{\sqrt[3]{x(x-1)}} \geq \frac{1}{\sqrt[3]{x^2}}$  on  $[2, \infty)$  and  $\int_2^\infty \frac{1}{\sqrt[3]{x^2}} dx$  diverges by Exercise 49,  $\int_2^\infty \frac{1}{\sqrt[3]{x(x-1)}} dx$  diverges.

- 60.** Because  $\frac{1}{\sqrt{x(1+x)}} \leq \frac{1}{x^{3/2}}$  on  $[1, \infty)$  and  $\int_1^\infty \frac{1}{x^{3/2}} dx$  converges by Exercise 49,  $\int_1^\infty \frac{1}{\sqrt{x(1+x)}} dx$  converges.

- 61.**  $\int_1^\infty \frac{2}{x^2} dx$  converges, and  $\frac{1 - \sin x}{x^2} \leq \frac{2}{x^2}$  on  $[1, \infty)$ , so  $\int_1^\infty \frac{1 - \sin x}{x^2} dx$  converges.

- 62.**  $\int_0^\infty \frac{1}{e^x} dx = \int_0^\infty e^{-x} dx$  converges, and  $\frac{1}{e^x} \geq \frac{1}{e^x + x}$  on  $[0, \infty)$ , so  $\int_0^\infty \frac{1}{e^x + x} dx$  converges.