p. 934 (12.2)

Compute the indicated limit.

5. $\lim_{(x,y)\to(1,3)} \dfrac{x^2 y}{4x^2 - y}$

7. $\lim_{(x,y)\to(\pi,1)} \dfrac{\cos xy}{y^2 + 1}$

Show that the indicated limit does not exist.

11. $\lim_{(x,y)\to(0,0)} \dfrac{3x^2}{x^2 + y^2}$

13. $\lim_{(x,y)\to(0,0)} \dfrac{4xy}{3y^2 - x^2}$

15. $\lim_{(x,y)\to(0,0)} \dfrac{2xy^2}{x^2 + y^4}$

17. $\lim_{(x,y)\to(0,0)} \dfrac{\sqrt[3]{x}\,y^2}{x + y^3}$

19. $\lim_{(x,y)\to(0,0)} \dfrac{y \sin x}{x^2 + y^2}$

21. $\lim_{(x,y)\to(1,2)} \dfrac{xy - 2x - y + 2}{x^2 - 2x + y^2 - 4y + 5}$

23. $\lim_{(x,y,z)\to(0,0,0)} \dfrac{3x^2}{x^2 + y^2 + z^2}$

25. $\lim_{(x,y,z)\to(0,0,0)} \dfrac{xyz}{x^3 + y^3 + z^3}$

Determine all points at which the given function is continuous.

39. $f(x, y) = 4xy + \sin 3x^2 y$

41. $f(x, y) = \sqrt{9 - x^2 - y^2}$

43. $f(x, y) = \ln(3 - x^2 + y)$

45. $f(x, y, z) = \dfrac{x^3}{y} + \sin z$

47. $f(x, y, z) = \sqrt{x^2 + y^2 + z^2 - 4}$

Use polar coordinates to find the indicated limit, if it exits.
Note that (x,y) $\rightarrow$ (0,0) is equivalent to r $\rightarrow 0$.

57. $\lim_{(x,y)\to(0,0)} \dfrac{\sqrt{x^2+y^2}}{\sin\sqrt{x^2+y^2}}$

59. $\lim_{(x,y)\to(0,0)} \dfrac{xy^2}{x^2+y^2}$