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Sec. 8.1 Answer Questions

Problem #9
\[ f(x, y) = \frac{1}{\sqrt{x - y}} \]
\[ f(2,1) = \frac{1}{\sqrt{2-1}} = 1 \]
\[ f(-1,-5) = \frac{1}{\sqrt{-1-(-5)}} = \frac{1}{\sqrt{4}} = \frac{1}{2} \]

Problem #11
\[ f(x, y) = x + 3y \]
Domain: all x’s and all y’s; x all real numbers and y all real numbers

Problem #13
\[ f(x, y) = \frac{x}{x + y} \]
x + y can’t be 0
x + y ≠ 0

Problem #15
\[ f(x, y) = \sqrt{16 - x^2 - y^2} \]
16 - x^2 - y^2 ≥ 0
16 ≥ x^2 + y^2
x^2 + y^2 ≤ 16

Problem #17
distance between points (1, 2,3) and (0, 4, 5)
\[ \sqrt{(1-0)^2 + (2-4)^2 + (3-5)^2} = \sqrt{1+4+4} = \sqrt{9} = 3 \]

Problem #25
\[ x^2 + y^2 + z^2 = 36 \]
sphere centered at the origin, radius of 6

Problem #27
\[ f(x, y) = \frac{1}{1 + x^2 + y^2} \]
As x and y become large, z goes to 0
f(0, 0) = 1
Level curve f

Problem #35
\[ z = f(x, y) = 1 - x^2 - y^2 \]
\[ z_0 = 1 \]
\[ 1 - x^2 - y^2 = 1 \]
\[ x^2 + y^2 = 0 \]
\( z_0 = 0 \)
\( 1 - x^2 - y^2 = 0 \)
\( x^2 + y^2 = 1 \)

\( z_0 = -3 \)
\( 1 - x^2 - y^2 = -3 \)
\( x^2 + y^2 = 4 \)

\( z_0 = -8 \)
\( x^2 + y^2 = 9 \)