Surface Area HwK

① Find the area of the surface $z = f(x,y)$ over the given region R:

(a) $f(x,y) = 2x + 2y$, R is triangle in xy-plane with vertices $(0,0), (2,0), (0,2)$.

(b) $f(x,y) = 8 + 2x + 2y$, $R = \{(x,y) : x^2 + y^2 \leq 4\}$

(c) $f(x,y) = 9 - x^2$, R is square with vertices $(0,0), (3,0), (0,3), (3,3)$.

(d) $f(x,y) = \ln|\sec x|$, $R = \{(x,y) : 0 \leq x \leq \frac{\pi}{4},\ 0 \leq y \leq \tan x\}$

(e) $f(x,y) = \sqrt{x^2+y^2}$, $R = \{(x,y) : 0 \leq f(x,y) \leq 1\}$

(f) $f(x,y) = \sqrt{a^2 - x^2 - y^2}$, $R = \{(x,y) : x^2 + y^2 \leq b^2,\ b < a\}$

(g) $f(x,y) = k\sqrt{x^2+y^2}$ $(k > 0)$, $R = \{(x,y) : x^2 + y^2 \leq r^2\}$

Answers for Surface Area HwK

(1)

(a) 6

(b) 12π

(c) 29.24

(d) $\sqrt{2}-1 \approx .41$

(e) $\sqrt{2}\,\pi \approx 4.4$

(f) $2\pi a\left(a-\sqrt{a^2-b^2}\right)$

(g) $\pi r^2\sqrt{k^2+1}$