

$$5. f(x,y) = 10 - 5x - 2y$$

$$f_x = -5$$

$$f_y = -2$$

y's

$$0 = 10 - 5x - 2y$$

$$2y = 10 - 5x$$

$$y = 5 - \frac{5}{2}x$$

x's

$$0 = 10 - 5x$$

$$5x = 10$$

$$x = 2$$

$$S = \int_{x=0}^{x=2} \int_{y=0}^{y=5-\frac{5}{2}x} \sqrt{1 + (-5)^2 + (-2)^2} dy dx$$

$$S = \sqrt{30} \int_{x=0}^{x=2} \int_{y=0}^{y=5-\frac{5}{2}x} dy dx$$

$$S = \sqrt{30} \int_{x=0}^{x=2} [y]_{y=0}^{y=5-\frac{5}{2}x} dx$$

$$S = \sqrt{30} \int_{x=0}^{x=2} [5 - \frac{5}{2}x - 0] dx$$

$$S = \sqrt{30} \left[5x - \frac{5}{2} \cdot \frac{x^2}{2} \right]_{x=0}^{x=2}$$

$$S = \sqrt{30} \left[5x - \frac{5}{4}x^2 \right]_{x=0}^{x=2}$$

$$S = \sqrt{30} \left[5(2) - \frac{5}{4}(2)^2 - \left(5(0) - \frac{5}{4}(0)^2 \right) \right]$$

$$S = \sqrt{30} [10 - 5 - 0]$$

$$S = \boxed{5\sqrt{30}}$$