Complete the Square

2. Let x, y be the real numbers. Find the minimum value of the following expression.

$$x^2+y^2-8x-5y+15$$

$= X^2-8X+Y^2-5Y+15$

$= (X-4)^2-16+(Y-\frac{5}{2})^2-\frac{25}{4}+15$

$= (X-4)^2+(Y-\frac{5}{2})^2-\frac{29}{4} \geq -\frac{29}{4}$

Since $(X-4)^2, (Y-\frac{5}{2})^2 \geq 0$