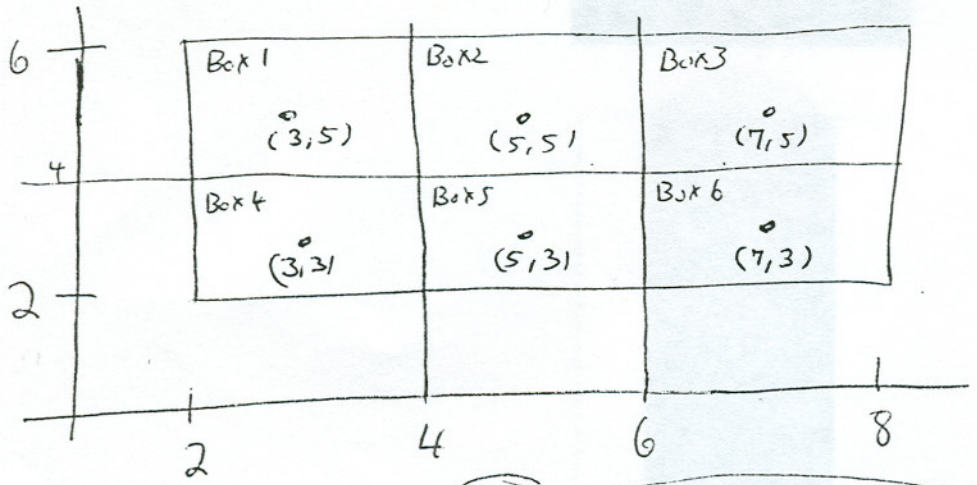
~~107~~ 122

2. Let R be the region $R = \{(x, y) \mid 2 \le x \le 8, \text{ and } 2 \le y \le 6\}$. Let P be the partition of R into six equal squares by the lines $x = 4$, $x = 6$, and $y = 4$. Approximate $\iint_R (72 - x^2 - y)\, dA$ by calculating the corresponding Riemann sum $\sum_{k=1}^{6} f(\bar{x}_k, \bar{y}_k)\Delta A_k$, where $(\bar{x}_k, \bar{y}_k)$ is the center of the k^{th} box, and ΔA_k is the area of the k^{th} box. (Be sure to answer the question I have asked. You will receive no credit for computing the integral directly. Express your answer as a sum of products. There is no need to do any arithmetic.)



Each box has area 4
So $\Delta A_k = 4$. Because

$$\sum_{k=1}^{6} f(\bar{x}_k, \bar{y}_k)\,\Delta A_k = 4\Big((72-9-5) + (72-25-5) + (72-49-5) + (72-9-3) + (72-25-3) + (72-49-3)\Big)$$