$$lcm(a,b)\cdot gcd(a,b)=a\cdot b.$$

$$a=p_1^{e_1}\cdot p_2^{e_2}\cdot\ldots\cdot p_K^{e_K}$$

$$b=p_1^{a_1}\cdot p_2^{a_2}\cdot\ldots\cdot p_K^{a_K}$$

$$lcm(a,b)=p_1^{\max(a_1,e_1)}\cdot p_2^{\max(a_2,e_2)}\cdot\ \cdots\ \cdot p_K^{\max(e_K,p_K)}$$

$$gcd(a,b)=p_1^{\min(a_1,e_1)}\cdot p_2^{\min(a_2,e_2)}\ \cdots\ p_K^{\min(a_K,e_K)}$$

$$lcm(a,b)\cdot gcd(a,b)$$

$$=p_1^{\max(a_1,e_1)+\min(a_1,e_1)}\cdot p_2^{\max(a_2,e_2)+\min(a_2,e_2)}\cdot\ldots\cdot p_K^{\max(a_K,e_K)+\min(a_K,e_K)}$$

Aside:

$$\max(x,y)+\min(x,y)=x+y$$

$$=p_1^{a_1+e_1}\cdot p_2^{a_2+e_2}\cdot p_3^{a_3+e_3}\cdot\ldots\cdot p_K^{a_K+e_K}$$

$$=\underbrace{\left(p_1^{e_1}\cdot p_2^{e_2}\cdot\ldots\cdot p_K^{e_K}\right)}_{a}\cdot\underbrace{\left(p_1^{a_1}\cdot p_2^{a_2}\cdot\ldots\cdot p_K^{a_K}\right)}_{b}=ab.$$

1

$$\begin{array}{r|l} 184 & 2 \\ 92 & 2 \\ 46 & 2 \\ 23 & 23 \\ 1 & \end{array} \qquad 184=2^3\cdot 23 \checkmark \qquad\qquad \begin{array}{r|l} 138 & 2 \\ 69 & 3 \\ 23 & 23 \\ 1 & \end{array} \qquad 138=2\cdot 3\cdot 23 \checkmark$$

$gcd(184,138)=2^1\cdot 23^1=46$ packages.

$\frac{184}{46}=4\ \frac{\text{oranges}}{\text{package}}$; $\frac{138}{46}=3\ \frac{\text{chocolates}}{\text{package}}$.