

|      | Stars           | Circles         | S.S            |          |
|------|-----------------|-----------------|----------------|----------|
| cost | 1               | 0.75            | 1.5            | - 312    |
| size | $\frac{1}{100}$ | $\frac{1}{120}$ | $\frac{1}{80}$ | - 3      |
|      |                 |                 |                | 300 bags |

$$\begin{aligned}
 ST + C + SS &= 300 && \text{bags} \\
 ST + \frac{3}{4}C + \frac{3}{2}SS &= 312 && \text{cost} \\
 \frac{1}{100}ST + \frac{1}{120}C + \frac{1}{80}SS &= 3 && \text{boxes}
 \end{aligned}$$

Strategy - We have 3 unknowns, 3 equations  $\Rightarrow$  move toward 2:2, then to 1:1, then "reverse".

Equation 1:  $ST = 300 - C - SS$  substitute that into (2) & (3)

#2 becomes  $300 - C - SS + \frac{3}{4}C + \frac{3}{2}SS = 312 \Rightarrow$   
 $-\frac{1}{4}C + \frac{1}{2}SS = 12$  (Eq 4)

#3 - first multiply by 100  $\Rightarrow ST + \frac{5}{6}C + \frac{5}{4}SS = 300$   
 then substitute  $ST = 300 - C - SS$   
 $300 - C - SS + \frac{5}{6}C + \frac{5}{4}SS = 300 \Rightarrow$   
 $-\frac{1}{6}C + \frac{1}{4}SS = 0$  (Eq 5)

2 equations, 2 unknowns

Rewrite (Eq 5)  $\frac{1}{4}SS = \frac{1}{6}C \Rightarrow \underline{SS = \frac{2}{3}C}$

substitute into (Eq 4)

$$\begin{aligned}
 -\frac{1}{4}C + \frac{1}{2}\left(\frac{2}{3}C\right) &= 12 \\
 -\frac{1}{4}C + \frac{1}{3}C &= 12 \Rightarrow \left(-\frac{1}{12} + \frac{4}{12}\right)C = 12 \quad \underline{C = 12 \cdot 12 = 144}
 \end{aligned}$$

thus,  $SS = \frac{2}{3}(144) = \underline{96}$

$ST = 300 - 144 - 96 = \underline{60}$