Q.1. The average temperature (t) of x number of days is 40 degrees. The temperature of one more day is added,which is 45 degrees. The new average temperature is 41 degrees. What is x?

Average = $\sum (t_i)/x$

Premises:

1) $t_{x+1} = 45°$

2) $\sum_{x} t_i/x = 40°$

3) $\sum_{x+1} t_i/(x+1) = 41°$

Formula: [1]

$$\sum_{x+1} t_i/(x+1) = t_{x+1}/(x+1)+x/(x+1)*\sum_{x} t_i/x$$

[1]

$$\sum_{x+1} t_i/(x+1) = (t_1 + t_2+ .... + t_i + t_{i+1})/(x+1)=$$
$$(x/x)*(t_1 + t_2+ .... + t_i + t_{i+1})/(x+1)=$$
$$x/(x+1)*(t_1 + t_2+ .... + t_i + t_{i+1})/x=$$
$$(\sum_{x} t_i+t_{x+1})/x * x/(x+1)=$$
$$[x/(x+1)]*(\sum_{x} t_i/x+t_{x+1}/(x))=$$
$$t_{x+1}/(x+1) + x/(x+1)*\sum_{x} t_i/x$$

Calculation using formula 1:

$$\sum_{x+1} t_i/(x+1) = t_{x+1}/(x+1)+x/(x+1)*\sum_{x} t_i/x$$
$$41° = t_{x+1}/(x+1) + x/(x+1)*40°$$
$$41° = 45°/(x+1) + x/(x+1)*40°$$
$$41°(x+1) = 45° + 40°x$$
$$41x + 41 = 45 + 40x$$

x = 4