[J8 Answers]

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[1] $x = 4,\ y = 8$

[2] Let x represent the number of 20-yen stamps and y represent the number of 50-yen stamps. Then the total cost of all the 20-yen stamps is $20\,x$ and the total cost of all the 50-yen stamps is $50\,x$. Since the total number of stamps is 12 and the total cost of the stamps is 450-yen, we have

$$\begin{pmatrix} x + y = 12 \\ 20\,x + 50\,y = 450 \end{pmatrix}$$

So, $x = 5,\ y = 7$. We bought five 20-yen and seven 50-yen stamps.

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[3] Let x represent the cost of one pencil (yen) and y represent the cost of one notebook (yen). Then $4\,x + 3\,y = 520$ and $8\,x + 5\,y = 920$. So,

$$\begin{pmatrix} 4\,x + 3\,y = 520 \\ 8\,x + 5\,y = 920 \end{pmatrix}$$

So, $x = 40,\ y = 120$. Therefore, the cost of one pencil is 40-yen and the cost of one notebook is 120-yen.

[4]

Let x = density of medicine A $(\frac{\text{kg}}{L})$.

Let y = density of medicine B $(\frac{\text{kg}}{L})$.

Then,

$5\,L \cdot x\,\frac{\text{kg}}{L}$ = weight (kg) of 5 liters of medicine A, $10\,L \cdot x\,\frac{\text{kg}}{L}$ = weight (kg) of 10 liters of medicine A.

$2\,L \cdot y\,\frac{\text{kg}}{L}$ = weight (kg) of 2 liters of medicine B, $6\,L \cdot y\,\frac{\text{kg}}{L}$ = weight (kg) of 2 liters of medicine B.

Since we are told the combined weights,

$$\begin{pmatrix} 5\,x + 2\,y = 9 \\ 10\,x + 6\,y = 21 \end{pmatrix}$$

So, $x = \frac{6}{5},\ y = \frac{3}{2}$. Therefore, the density of medicine A is $1.2\ \frac{\text{kg}}{L}$ and the density of medicine B is $1.5\ \frac{\text{kg}}{L}$.