

反射テスト 1次方程式 連立方程式 文字の置き換え 01

1. 次の連立方程式を解け。(S級50秒, A級1分40秒, B級3分, C級5分)

$$(1) \begin{cases} \frac{1}{x} + \frac{1}{y} = 5 \\ \frac{1}{x} - \frac{1}{y} = 1 \end{cases}$$

$$(2) \begin{cases} \frac{4}{x} - \frac{3}{y} = 9 \\ \frac{6}{x} - \frac{5}{y} = 14 \end{cases}$$

2. 次の連立方程式を解け。(S級1分10秒, A級2分10秒, B級3分40秒, C級6分)

$$(1) \begin{cases} \frac{3}{x} + \frac{2}{y} = 7 \\ \frac{1}{x} - \frac{1}{y} = -1 \end{cases}$$

$$(2) \begin{cases} \frac{3}{x} - \frac{8}{y} = 10 \\ \frac{5}{x} - \frac{6}{y} = 13 \end{cases}$$

反射テスト 1次方程式 連立方程式 文字の置き換え 01 解答解説

1. 次の連立方程式を解け。(S級50秒, A級1分40秒, B級3分, C級5分)

★文字の置き換え(分数の連立方程式)

$\frac{1}{x} = a$, $\frac{1}{y} = b$ において連立方程式を解く.

$$(1) \begin{cases} \frac{1}{x} + \frac{1}{y} = 5 & \dots ① \\ \frac{1}{x} - \frac{1}{y} = 1 & \dots ② \end{cases}$$

☆ $\frac{1}{x} = a$, $\frac{1}{y} = b$ とおく.

$$\begin{cases} a + b = 5 & \dots ③ \\ a - b = 1 & \dots ④ \end{cases}$$

$$\begin{array}{r} ③ \quad a + b = 5 \\ +) ④ \quad a - b = 1 \\ \hline 2a \quad = 6 \\ a \quad = 3 \quad \dots ⑤ \end{array}$$

③ に代入して,

$$\begin{array}{r} 3 + b = 5 \\ b = 2 \quad \dots ⑥ \end{array}$$

$$\begin{array}{l} ⑤ \Rightarrow \frac{1}{x} = 3 \\ 1 = 3x \quad \leftarrow \text{両辺} \times x \\ \frac{1}{3} = x \quad \leftarrow \text{両辺} \div 3 \end{array}$$

$$\begin{array}{l} ⑥ \Rightarrow \frac{1}{y} = 2 \\ 1 = 2y \quad \leftarrow \text{両辺} \times y \\ \frac{1}{2} = y \quad \leftarrow \text{両辺} \div 2 \end{array}$$

$$(x, y) = \left(\frac{1}{3}, \frac{1}{2} \right) \quad \dots \text{答え}$$

☆ $a, b \Rightarrow x, y$ にするところでは逆数と考えると早い.

$$(2) \begin{cases} \frac{4}{x} - \frac{3}{y} = 9 & \dots ① \\ \frac{6}{x} - \frac{5}{y} = 14 & \dots ② \end{cases}$$

☆ $\frac{1}{x} = a$, $\frac{1}{y} = b$ とおく.

$$\begin{cases} 4a - 3b = 9 & \dots ③ \\ 6a - 5b = 14 & \dots ④ \end{cases}$$

$$\begin{array}{r} ③ \times 3 \quad 12a - 9b = 27 \\ -) ④ \times 2 \quad 12a - 10b = 28 \\ \hline \quad \quad \quad b = -1 \quad \dots ⑤ \end{array}$$

③ に代入して,

$$\begin{array}{r} 4a - 3 \times (-1) = 9 \\ 4a + 3 = 9 \\ 4a = 6 \\ a = \frac{3}{2} \quad \dots ⑥ \end{array}$$

$$\begin{array}{l} ⑥ \Rightarrow \frac{1}{x} = \frac{3}{2} \\ 1 = \frac{3}{2}x \quad \leftarrow \text{両辺} \times x \\ \frac{2}{3} = x \quad \leftarrow \text{両辺} \div \frac{3}{2} \end{array}$$

$$\begin{array}{l} ⑤ \Rightarrow \frac{1}{y} = -1 \\ 1 = -y \quad \leftarrow \text{両辺} \times y \\ -1 = y \end{array}$$

$$(x, y) = \left(\frac{2}{3}, -1 \right) \quad \dots \text{答え}$$

2. 次の連立方程式を解け。(S級1分10秒, A級2分10秒, B級3分40秒, C級6分)

$$(1) \begin{cases} \frac{3}{x} + \frac{2}{y} = 7 & \dots \textcircled{1} \\ \frac{1}{x} - \frac{1}{y} = -1 & \dots \textcircled{2} \end{cases}$$

☆ $\frac{1}{x} = a, \frac{1}{y} = b$ とおく.

$$\begin{cases} 3a + 2b = 7 & \dots \textcircled{3} \\ a - b = -1 & \dots \textcircled{4} \end{cases}$$

$$\begin{array}{r} \textcircled{3} \quad 3a + 2b = 7 \\ +) \textcircled{4} \times 2 \quad 2a - 2b = -2 \\ \hline 5a = 5 \\ a = 1 \quad \dots \textcircled{5} \end{array}$$

④ に代入して,

$$\begin{aligned} 1 - b &= -1 \\ b &= 2 \quad \dots \textcircled{6} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \Rightarrow \frac{1}{x} &= a \\ 1 &= x \quad \leftarrow \text{両辺} \times x \end{aligned}$$

$$\begin{aligned} \textcircled{6} \Rightarrow \frac{1}{y} &= 2 \\ 1 &= 2y \quad \leftarrow \text{両辺} \times y \\ \frac{1}{2} &= y \quad \leftarrow \text{両辺} \div 2 \end{aligned}$$

$$(x, y) = \left(1, \frac{1}{2}\right) \quad \dots \text{答え}$$

$$(2) \begin{cases} \frac{3}{x} - \frac{8}{y} = 10 & \dots \textcircled{1} \\ \frac{5}{x} - \frac{6}{y} = 13 & \dots \textcircled{2} \end{cases}$$

☆ $\frac{1}{x} = a, \frac{1}{y} = b$ とおく.

$$\begin{cases} 3a - 8b = 10 & \dots \textcircled{3} \\ 5a - 6b = 13 & \dots \textcircled{4} \end{cases}$$

$$\begin{array}{r} \textcircled{3} \times 3 \quad 9a - 24b = 30 \\ -) \textcircled{4} \times 4 \quad 20a - 24b = 52 \\ \hline -11a = -22 \\ a = 2 \quad \dots \textcircled{5} \end{array}$$

③ に代入して,

$$\begin{aligned} 3 \times 2 - 8b &= 10 \\ 6 - 8b &= 10 \\ -8b &= 4 \\ b &= -\frac{1}{2} \quad \dots \textcircled{6} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \Rightarrow \frac{1}{x} &= 2 \\ 1 &= 2x \quad \leftarrow \text{両辺} \times x \\ \frac{1}{2} &= x \end{aligned}$$

$$\begin{aligned} \textcircled{6} \Rightarrow \frac{1}{y} &= -\frac{1}{2} \\ 1 &= -\frac{1}{2}y \quad \leftarrow \text{両辺} \times y \\ -2 &= y \quad \leftarrow \text{両辺} \div \left(-\frac{1}{2}\right) \end{aligned}$$

$$(x, y) = \left(\frac{1}{2}, -2\right) \quad \dots \text{答え}$$