

反射テスト 2次方程式 いろいろ 03

1. 次の方程式を解け。(S級2分, A級3分, B級4分, C級5分30秒)

(1) $x^2 + 4 = -x + 4$

(2) $x^2 - 12 = 0$

(3) $x^2 - 10x + 9 = 0$

(4) $2x^2 + 20x - 50 = 0$

(5) $x^2 + 2x - 15 = 0$

(6) $2x^2 - 11x - 2 = 0$

(7) $24x^2 = 300$

(8) $10x^2 + 45x + 50 = 0$

(9) $x^2 + 130x - 3000 = 0$

(10) $(x + 5)^2 - 3(x + 5) = 0$

2. 次の方程式を解け。(S級2分, A級3分, B級4分, C級5分30秒)

(1) $x^2 + 5 = x + 5$

(2) $x^2 - 20 = 0$

(3) $x^2 - 9x + 8 = 0$

(4) $2x^2 + 16x - 22 = 0$

(5) $x^2 + 2x - 35 = 0$

(6) $2x^2 - 11x - 3 = 0$

(7) $36x^2 = 300$

(8) $8x^2 + 44x + 48 = 0$

(9) $x^2 + 30x - 4000 = 0$

(10) $(x + 2)^2 - 5(x + 2) = 0$

反射テスト 2次方程式 いろいろ 03 解答解説

1. 次の方程式を解け。(S級2分, A級3分, B級4分, C級5分30秒)

★2次方程式 (quadratic equation)

- ① 早い方法がわからなければ, 右辺 = 0 に変形する.
 ② 左辺を因数分解. できなければ解の公式.

(1) $x^2 + 4 = -x + 4$

$$\begin{aligned} x^2 + x &= 0 && \leftarrow \text{右辺} = 0 \text{ の形} \\ x(x+1) &= 0 && \leftarrow \text{左辺を因数分解} \\ x = 0 &\text{ 又は } x + 1 = 0 \\ \mathbf{x = 0 \text{ 又は } x = -1} \end{aligned}$$

(2) $x^2 - 12 = 0$

$$\begin{aligned} x^2 &= 12 \\ \mathbf{x} &= \pm 2\sqrt{3} \end{aligned}$$

(3) $x^2 - 10x + 9 = 0$

$$\begin{aligned} (x-1)(x-9) &= 0 \\ x-1 = 0 &\text{ 又は } x-9 = 0 \\ \mathbf{x = 1 \text{ 又は } x = 9} \end{aligned}$$

(4) $2x^2 + 20x - 50 = 0$

$$\begin{aligned} x^2 + 10x - 25 &= 0 && \leftarrow \text{両辺} \div 2 \\ x = \frac{-5 \pm \sqrt{5^2 - 1 \times (-25)}}{1} && \leftarrow \text{偶数公式} \\ x = -5 \pm \sqrt{50} \\ \mathbf{x = -5 \pm 5\sqrt{2}} \end{aligned}$$

(5) $x^2 + 2x - 15 = 0$

$$\begin{aligned} (x+5)(x-3) &= 0 \\ x+5 = 0 &\text{ 又は } x-3 = 0 \\ \mathbf{x = -5 \text{ 又は } x = 3} \end{aligned}$$

(6) $2x^2 - 11x - 2 = 0$

$$\begin{aligned} x &= \frac{-(-11) \pm \sqrt{(-11)^2 - 4 \times 2 \times (-2)}}{2 \times 2} && \leftarrow \text{解の公式} \\ \mathbf{x} &= \frac{11 \pm \sqrt{137}}{4} \end{aligned}$$

(7) $24x^2 = 300$

$$\begin{aligned} x^2 &= \frac{300}{24} && \leftarrow \text{両辺} \div 24 \\ x^2 &= \frac{25}{2} \\ x &= \pm \sqrt{\frac{25}{2}} \\ \mathbf{x} &= \pm \frac{5\sqrt{2}}{2} \end{aligned}$$

(8) $10x^2 + 45x + 50 = 0$

$$\begin{aligned} 2x^2 + 9x + 10 &= 0 && \leftarrow \text{両辺} \div 5 \\ (2x+5)(x+2) &= 0 && \leftarrow \text{たすき掛けの因数分解} \\ 2x+5 = 0 &\text{ 又は } x+2 = 0 \\ \mathbf{x = -\frac{5}{2} \text{ 又は } x = -2} \end{aligned}$$

(9) $x^2 + 130x - 3000 = 0$

$$\begin{aligned} (x+150)(x-20) &= 0 && \leftarrow \text{左辺を因数分解} \\ x+150 = 0 &\text{ 又は } x-20 = 0 \\ \mathbf{x = -150 \text{ 又は } x = 20} \end{aligned}$$

☆因数分解が見えない場合は解の公式 (偶数公式)

(10) $(x+5)^2 - 3(x+5) = 0$

$$\begin{aligned} A = x+5 &\text{ とおくと,} \\ A^2 - 3A &= 0 \\ A(A-3) &= 0 \\ (x+5)\{(x+5)-3\} &= 0 \\ (x+5)(x+2) &= 0 \\ x+5 = 0 &\text{ 又は } x+2 = 0 \\ \mathbf{x = -5 \text{ 又は } x = -2} \end{aligned}$$

2. 次の方程式を解け。(S級2分, A級3分, B級4分, C級5分30秒)

(1) $x^2 + 5 = x + 5$

$$\begin{aligned} x^2 - x &= 0 && \leftarrow \text{右辺} = 0 \text{ の形} \\ x(x-1) &= 0 && \leftarrow \text{左辺を因数分解} \\ x = 0 &\text{ 又は } x - 1 = 0 \\ \mathbf{x = 0 \text{ 又は } x = 1} \end{aligned}$$

(2) $x^2 - 20 = 0$

$$\begin{aligned} x^2 &= 20 \\ \mathbf{x} &= \pm 2\sqrt{5} \end{aligned}$$

(3) $x^2 - 9x + 8 = 0$

$$\begin{aligned} (x-1)(x-8) &= 0 \\ x-1 = 0 &\text{ 又は } x-8 = 0 \\ \mathbf{x = 1 \text{ 又は } x = 8} \end{aligned}$$

(4) $2x^2 + 16x - 22 = 0$

$$\begin{aligned} x^2 + 8x - 11 &= 0 && \leftarrow \text{両辺} \div 2 \\ x = \frac{-4 \pm \sqrt{4^2 - 1 \times (-11)}}{1} && \leftarrow \text{偶数公式} \\ x &= -4 \pm \sqrt{27} \\ \mathbf{x} &= -4 \pm 3\sqrt{3} \end{aligned}$$

(5) $x^2 + 2x - 35 = 0$

$$\begin{aligned} (x+7)(x-5) &= 0 \\ x+7 = 0 &\text{ 又は } x-5 = 0 \\ \mathbf{x = -7 \text{ 又は } x = 5} \end{aligned}$$

(6) $2x^2 - 11x - 3 = 0$

$$\begin{aligned} x &= \frac{-(-11) \pm \sqrt{(-11)^2 - 4 \times 2 \times (-3)}}{2 \times 2} && \leftarrow \text{解の公式} \\ \mathbf{x} &= \frac{11 \pm \sqrt{145}}{4} \end{aligned}$$

(7) $36x^2 = 300$

$$\begin{aligned} x^2 &= \frac{300}{36} && \leftarrow \text{両辺} \div 36 \\ x^2 &= \frac{25}{3} \\ x &= \pm \sqrt{\frac{25}{3}} \\ \mathbf{x} &= \pm \frac{5\sqrt{3}}{3} \end{aligned}$$

(8) $8x^2 + 44x + 48 = 0$

$$\begin{aligned} 2x^2 + 11x + 12 &= 0 && \leftarrow \text{両辺} \div 4 \\ (x+4)(2x+3) &= 0 && \leftarrow \text{たすき掛けの因数分解} \\ x+4 = 0 &\text{ 又は } 2x+3 = 0 \\ \mathbf{x = -4 \text{ 又は } x = -\frac{3}{2}} \end{aligned}$$

(9) $x^2 + 30x - 4000 = 0$

$$\begin{aligned} (x+80)(x-50) &= 0 && \leftarrow \text{左辺を因数分解} \\ x+80 = 0 &\text{ 又は } x-50 = 0 \\ \mathbf{x = -80 \text{ 又は } x = 50} \end{aligned}$$

☆因数分解が見えない場合は解の公式 (偶数公式)

(10) $(x+2)^2 - 5(x+2) = 0$

$$\begin{aligned} A &= x+2 \text{ とおくと,} \\ A^2 - 5A &= 0 \\ A(A-5) &= 0 \\ (x+2)\{(x+2)-5\} &= 0 \\ (x+2)(x-3) &= 0 \\ x+2 = 0 &\text{ 又は } x-3 = 0 \\ \mathbf{x = -2 \text{ 又は } x = 3} \end{aligned}$$