

1. The product of two consecutive integers is 110. Find the integers.

$$\begin{array}{l} x \\ x+1 \end{array} \quad \begin{array}{l} x(x+1) = 110 \\ x^2 + x = 110 \end{array} \quad \begin{array}{l} x^2 + x - 110 = 0 \\ (x+11)(x-10) = 0 \\ x = -11, 10 \end{array} \quad \begin{array}{l} -110 \\ \uparrow \\ 11 \quad -10 \end{array} \quad \boxed{\begin{array}{l} -11, -10 \\ \text{or} \\ 10, 11 \end{array}}$$

2. The product of two consecutive, positive odd integers is 143. Find the integers.

$$\begin{array}{l} x \\ x+2 \end{array} \quad \begin{array}{l} x(x+2) = 143 \\ x^2 + 2x = 143 \end{array} \quad \begin{array}{l} x^2 + 2x - 143 = 0 \\ (x+13)(x-11) = 0 \\ x = 11, -13 \end{array} \quad \begin{array}{l} -143 \\ \uparrow \\ 13 \quad -11 \end{array} \quad \boxed{11, 13}$$

3. Find two consecutive integers such that the sum of their squares is 421. Find the integers.

$$\boxed{\begin{array}{l} -15, -14 \\ \text{or} \\ 14, 15 \end{array}} \quad \begin{array}{l} x^2 + (x+1)^2 = 421 \\ x^2 + x^2 + 2x + 1 = 420 \\ 2x^2 + 2x - 420 = 0 \end{array} \quad \begin{array}{l} x^2 + x - 210 = 0 \\ (x-14)(x+15) = 0 \\ x = 14, -15 \end{array} \quad \begin{array}{l} -210 \\ \uparrow \\ 21 \quad 10 \\ 3 \quad 7 \quad 2 \quad 5 \\ -14 \quad 15 \end{array}$$

4. Find three consecutive integers such that the product of the first integer and the second integer is 42. Find the integers.

$$\begin{array}{l} x \\ x+1 \\ x+2 \end{array} \quad \begin{array}{l} x(x+1) = 42 \\ x^2 + x = 42 \\ x^2 + x - 42 = 0 \end{array} \quad \begin{array}{l} (x+7)(x-6) = 0 \\ x = 6, -7 \end{array} \quad \begin{array}{l} -42 \\ \uparrow \\ 7 \quad -6 \end{array} \quad \boxed{\begin{array}{l} 6, 7, 8 \\ \text{or} \\ -7, -6, -5 \end{array}}$$

5. Find three positive consecutive integers such that the product of the first and second is 2 more than 9 times the third.

$$\begin{array}{l} x \\ x+1 \\ x+2 \end{array} \quad \begin{array}{l} x(x+1) = 9(x+2) + 2 \\ x^2 + x = 9x + 18 + 2 \\ x^2 - 8x - 20 = 0 \end{array} \quad \begin{array}{l} (x-10)(x+2) = 0 \\ x = 10, -2 \end{array} \quad \begin{array}{l} -20 \\ \uparrow \\ -10 \quad 2 \end{array} \quad \boxed{10, 11, 12}$$

6. Find two consecutive positive integers such that the square of the first decreased by 25 equals three times the second.

$$\begin{array}{l} x \\ x+1 \end{array} \quad \begin{array}{l} x^2 - 25 = 3(x+1) \\ x^2 - 25 = 3x + 3 \\ x^2 - 3x - 28 = 0 \\ (x-7)(x+4) = 0 \\ x = 7, -4 \end{array} \quad \begin{array}{l} -28 \\ \uparrow \\ -7 \quad 4 \end{array} \quad \boxed{7, 8}$$