

Answers  $\rightarrow$  Exercise 6 - Factoring.

1.  $x^2 - 3x + 2 = 0$   
 $(x-2)(x-1) = 0$   
 $x-2=0$  or  $x-1=0$   
 $x=2$  or  $x=1$

2.  $x^2 - x - 6 = 0$   
 $(x-3)(x+2) = 0$   
 $x-3=0$  or  $x+2=0$   
 $x=3$  or  $x=-2$

3.  $p^2 + 2p - 35 = 0$   
 $(p+7)(p-5) = 0$   
 $p+7=0$  or  $p-5=0$   
 $p=-7$  or  $p=5$

4.  $m^2 - 7m = 18$   
 $m^2 - 7m - 18 = 0$   
 $(m-9)(m+2) = 0$   
 $m-9=0$  or  $m+2=0$   
 $m=9$  or  $m=-2$

### Simple Trinomial

$$\textcircled{a} \quad p^2 + 2p - 35 = 0$$

$$(p - 5)(p + 7) = 0$$

$$\begin{array}{l|l} p - 5 = 0 & p + 7 = 0 \\ p = 5 & p = -7 \end{array}$$

$$-5 \times 7 = -35$$

$$-5 + 7 = 2$$

### Common factor

$$\textcircled{b} \quad y^2 - 3y = 0$$

$$(y)(y - 3) = 0$$

$$\begin{array}{l|l} y = 0 & y - 3 = 0 \\ & y = 3 \end{array}$$

$$\textcircled{c} \quad 3m^2 + 2m = 0$$

$$m(3m + 2) = 0$$

$$\begin{array}{l|l} m = 0 & 3m + 2 = 0 \\ & 3m = -2 \\ & m = -\frac{2}{3} \end{array}$$

### Trinomial Decomposition

$$\textcircled{1} \quad 2t^2 + 11t + 5 = 0$$

$$(2t^2 + t)(10t + 5) = 0$$

$$t(2t + 1) + 5(2t + 1) = 0$$

$$(2t + 1)(t + 5) = 0$$

$$\begin{array}{l|l} 2t + 1 = 0 & t + 5 = 0 \\ 2t = -1 & t = -5 \\ t = -\frac{1}{2} & \end{array}$$

$$1 \times 10 = 10$$

$$1 + 10 = 11$$

$$\textcircled{10} \quad 10y^2 - 16y = -6$$

$$10y^2 - 16y + 6 = 0$$

$$(10y^2 - 6y)(10y + 6) = 0$$

$$2y(5y - 3) - 2(5y - 3) = 0$$

$$(5y - 3)(2y - 2) = 0$$

$$\begin{array}{l|l} 5y - 3 = 0 & 2y - 2 = 0 \\ 5y = 3 & 2y = 2 \\ y = \frac{3}{5} & y = 1 \end{array}$$

$$-6 \times -10 = 60$$

$$-6 + -10 = -16$$

$$5. \quad 2a^2 + 3a - 2 = 0 \quad (\text{Decomposition})$$

$$\begin{array}{l} \text{Multiply } \rightarrow -4 \quad \text{Add } \rightarrow 3 \\ (2a^2 + 4a) - 1(a - 2) = 0 \\ 2a(a+2) - 1(a-2) = 0 \\ (a+2)(2a-1) = 0 \\ a+2=0 \quad \text{or} \quad 2a-1=0 \\ a=-2 \qquad \frac{2a}{2} = \frac{1}{2} \\ \qquad \qquad \qquad a = \frac{1}{2} \end{array}$$

$$6. \quad 3s^2 - 4s + 1 = 0 \quad (\text{Decomposition})$$

$$\begin{array}{l} \text{Multiply } \rightarrow 3 \quad \text{Add } \rightarrow -4 \\ (3s^2 - 3s) - 1(s + 1) = 0 \\ 3s(s-1) - 1(s-1) = 0 \\ s-1=0 \quad \text{or} \quad 3s-1=0 \\ s=1 \qquad \frac{3s}{3} = \frac{1}{3} \\ \qquad \qquad \qquad s = \frac{1}{3} \end{array}$$

$$7. \quad 2t^2 + 11t + 5 = 0 \quad (\text{Decomposition})$$

Multiply  $\rightarrow 10$     Add  $\rightarrow 11$

$$(2t^2 + 10t)(t + 5) = 0$$

$$2t(t+5) + 1(t+5) = 0$$

$$(t+5)(2t+1) = 0$$

$$t+5=0 \quad \text{or} \quad 2t+1=0$$

$$t = -5 \qquad \frac{2t}{2} = \frac{-1}{2}$$

$$t = -\frac{1}{2}$$

$$8. \quad 3x^2 + 7x - 6 = 0 \quad (\text{Decomposition}).$$

multiply  $\rightarrow -18$     Add  $\rightarrow 7$ .

$$(3x^2 + 9x - 2x - 6) = 0$$

$$3x(x+3) - 2(x+3) = 0$$

$$(x+3)(3x-2) = 0$$

$$x+3=0 \quad \text{or} \quad 3x-2=0$$

$$x = -3 \qquad \frac{3x}{3} = \frac{2}{3}$$

$$x = \frac{2}{3}$$

$$9. 4m^2 - 4m - 3 = 0$$

(Decomposition)

Multiply  $\rightarrow -12$  Add  $\rightarrow -4$

$$(4m^2 + 2m) - (6m - 3) = 0$$

$$2m(2m+1) - 3(2m+1) = 0$$

$$(2m+1)(2m-3) = 0$$

$$2m+1=0 \text{ or } 2m-3=0$$

$$\frac{2m}{2} = \frac{-1}{2}$$

$$m = \frac{-1}{2}$$

$$\frac{2m}{2} = \frac{3}{2}$$

$$m = \frac{3}{2}$$

$$10. 10y^2 - 16y = -6$$

$$10y^2 - 16y + 6 = 0$$

(Decomposition)

Multiply  $\rightarrow 60$  Add  $\rightarrow -16$

$$(10y^2 - 10y) + (6y + 6) = 0$$

$$10y(y-1) + 6(y+1) = 0$$

$$(y-1)(10y+6) = 0$$

$$y-1=0 \quad \text{or} \quad 10y+6=0$$

$$y=1$$

$$\frac{10y}{10} = \frac{6}{10}$$

$$y = \frac{6}{10}$$

$$y = \frac{3}{5} \text{ (lowest terms!)}$$

$$\begin{aligned} 11. \quad x^2 + 2x &= 0 && \text{(Common Factor)} \\ x(x+2) &= 0 \\ x=0 \text{ or } x+2 &= 0 \\ & x = -2 \end{aligned}$$

$$\begin{aligned} 12. \quad y^2 - 3y &= 0 && \text{(Common Factor)} \\ y(y-3) &= 0 \\ y=0 \text{ or } y-3 &= 0 \\ & y = 3 \end{aligned}$$

$$\begin{aligned} 13. \quad 3m^2 + 2m &= 0 && \text{(Common Factor)} \\ m(3m+2) &= 0 \\ m=0 \text{ or } 3m+2 &= 0 \\ & \frac{3m}{3} = \frac{-2}{3} \\ & m = -\frac{2}{3} \end{aligned}$$



$$14. \quad 5n^2 - 8n = 0 \quad (\text{Common Factor})$$

$$n(5n - 8) = 0$$

$$n = 0 \text{ or } 5n - 8 = 0$$

$$\cancel{5}n = \frac{8}{\cancel{5}}$$

$$n = \frac{8}{5}$$