

$$x^2 + bx + c$$

Name: _____

Date: _____

Learning Goal 1.2Factor trinomials of the form $ax^2 + bx + c$.**Example** Factor the following expression. Expand your answer to check your work.

$$\begin{aligned} \text{a. } s^2 + 11s + 30 & \\ &= s^2 + 6s + 5s + 30 \\ &= s(s + 6) + 5(s + 6) \\ &= (s + 6)(s + 5) \end{aligned}$$

or

$$\begin{aligned} 6 \times 5 &= 30 \\ 6 + 5 &= 11 \\ s^2 + 11s + 30 &= (s + 6)(s + 5) \end{aligned}$$

$$\begin{aligned} \text{a. } 20 - 9b + b^2 & \\ &= 20 - 5b - 4b + b^2 \\ &= 5(4 - b) - b(4 - b) \\ &= (4 - b)(5 - b) \end{aligned}$$

or

$$\begin{aligned} -4 \times -5 &= 20 \\ (-4) + (-5) &= -9 \\ b^2 - 9b + 20 &= (b - 4)(b - 5) \end{aligned}$$

$$\begin{aligned} \text{b. } n^2 - n - 30 & \\ &= n^2 - 6n + 5n - 30 \\ &= n(n - 6) + 5(n - 6) \\ &= (n - 6)(n + 5) \end{aligned}$$

or

$$\begin{aligned} (-6) \times 5 &= -30 \\ (-6) + 5 &= -1 \\ n^2 - n - 30 &= (n - 6)(n + 5) \end{aligned}$$

$$\begin{aligned} \text{c. } -4t^2 - 16t + 128 & \\ &= -4(t^2 + 4t - 32) \\ &= -4(t^2 + 8t - 4t - 32) \\ &= -4(t(t + 8) - 4(t + 8)) \\ &= -4(t + 8)(t - 4) \end{aligned}$$

or

$$\begin{aligned} 8 \times (-4) &= -32 \\ 8 + (-4) &= 4 \\ -4(t^2 + 4t - 32) & \\ &= -4(t + 8)(t - 4) \end{aligned}$$

$$\begin{aligned} \text{d. } -24 - 5d + d^2 & \\ &= d^2 - 5d - 24 \\ &= d^2 - 8d + 3d - 24 \\ &= d(d - 8) + 3(d - 8) \\ &= (d - 8)(d + 3) \end{aligned}$$

or

$$\begin{aligned} (-8) \times 3 &= -24 \\ (-8) + 3 &= -5 \\ d^2 - 5d - 24 &= (d - 8)(d + 3) \end{aligned}$$

$$\begin{aligned} \text{e. } -30 + 7m + m^2 & \\ &= m^2 + 7m - 30 \\ &= m + 10m - 3m - 30 \\ &= m(m + 10) - 3(m + 10) \\ &= (m + 10)(m - 3) \end{aligned}$$

or

$$\begin{aligned} (-3) \times 10 &= -30 \\ (-3) + 10 &= 7 \\ m^2 + 7m - 30 &= (m - 3)(m + 10) \end{aligned}$$