

Split the Middle Term

$$ax^2 + bx + c$$

Factor any GCF

Find the product of ac.

Find two numbers m and n

$$\text{Multiply to ac } m \cdot n = a \cdot c$$

$$\text{Add to b } m + n = b$$

Split the middle term using m and n

$$ax^2 + bx + c$$

$$ax^2 + mx + nx + c$$

Factor by grouping

$$8(-21) = \underline{-168}$$

$$-21 \cdot 8$$

$$-8 \cdot 21$$

$$\underline{-24 \cdot 7}$$

Factor:  $8u^2 - 17u - 21$

$$(8u^2 - 24u) + (7u - 21)$$

$$\underline{8u(u-3)} + \underline{7(u-3)}$$

$$(8u+7)(u-3)$$

$$6 \cdot -20 = \underline{-120}$$

$$-20 \cdot 6$$

$$-6 \cdot 20$$

$$-10 \cdot 12$$

$$-12 \cdot 10$$

$$\underline{-5 \cdot 24}$$

$$-24 \cdot 5$$

Factor:  $6x^2 + 19x - 20$

$$(6x^2 - 5x) + (24x - 20)$$

$$x(6x-5) + 4(6x-5)$$

$$(6x-5)(x+4)$$

$$\underline{3 \cdot 5 = 15}$$

$$5 \cdot 3$$

Factor:  $3t^2 + 8t + 5$

$$(3t^2 + 3t) + (5t + 5)$$

$$3t(t+1) + 5(t+1)$$

$$(3t+5)(t+1)$$

$$\underline{2 \cdot 14 = 28}$$

$$-7 \cdot -4$$

Factor:  $10y^2 - 55y + 70$

$$\underline{5}(2y^2 - 11y + 14)$$

$$(2y^2 - 4y)(-7y + 14)$$

$$2y(y-2) - 7(y-2)$$

$$\underline{5(2y-7)(y-2)}$$

Factor:  $16x^2 - 32x + 12$

$$\underline{4}(4x^2 - 8x + 3)$$

$$(4x^2 - 6x)(-2x + 3)$$

$$2x(2x-3) - 1(2x-3)$$

$$\underline{12}$$

$$-6 \cdot -2$$

$$4(2x-1)(2x-3)$$

$$a \cdot b = 0$$

What you will learn about:  
Solve by Factoring

Zero Product Property

$a \cdot b = 0$ , then either  $a = 0$  or  $b = 0$  or both.

$$\begin{array}{l|l} \text{Solve: } (x+1)(x-4) = 0 & \\ \hline x+1=0 & x-4=0 \\ x=-1 & x=4 \end{array}$$

$$\begin{array}{l} (-1+1)(-1-4) \\ (0)(-5) \\ (4+1)(4-4) \\ (5)(0) \end{array}$$

$$\begin{array}{l|l} \text{Solve: } (5n-2)(6n-1) = 0 & \\ \hline 5n-2=0 & 6n-1=0 \\ 5n=2 & 6n=1 \\ n=\frac{2}{5} & n=\frac{1}{6} \end{array}$$

$$\text{Solve: } (x+1)(x-4) = 0$$

$$\begin{array}{l|l} \text{Solve: } (4p+3)(4p-3) = 0 & \\ \hline 4p+3=0 & 4p-3=0 \\ 4p=-3 & 4p=3 \\ p=-\frac{3}{4} & p=\frac{3}{4} \end{array}$$

$$\text{Solve: } \cancel{(x+1)(x-4) = 0}$$

$$\begin{array}{l|l} \text{Solve: } 3p(10p+7) = 0 & \\ \hline \frac{3p}{3} = \frac{0}{3} & 10p+7=0 \\ p=0 & 10p=-7 \\ & p=-\frac{7}{10} \end{array}$$

$$\begin{array}{l} \text{Solve: } w(2w + 3) = 0 \\ w = 0 \quad \left\{ \begin{array}{l} 2w + 3 = 0 \\ 2w = -3 \\ w = -\frac{3}{2} \end{array} \right. \end{array}$$

$$\text{Solve: } x^2 + 2x - 8 = 0$$

$$\text{Solve: } b^2 + 9b + 14 = 0$$

$$\text{Solve: } 2y^2 = 13y + 45$$

$$\text{Solve: } 3c^2 = 10c - 8$$

$$\text{Solve: } 5x^2 - 13x = 7x$$

Solve:  $144q^2 = 25$

Solve:  $36x^2 = 121$

Solve:  $2y^2 = 13y + 45$

Solve:  $(3x - 8)(x - 1) = 3x$

Solve:  $(2m + 1)(m + 3) = 12m$

Solve:  $(k + 1)(k - 1) = 8$

Solve:  $8x^3 = 24x^2 - 18x$

Solve:  $16y^2 = 32y^3 + 2y$

Solve:  $4x^2 = 16x + 84$

Solve:  $18a^2 - 30 = -33a$

Find the product of two consecutive integers is 132. Find the integers.

The product of two consecutive integers is 240. Find the integers.