

Factoring to Solve Quadratic Equations

Zero-Product Property

For any real numbers a and b , if $ab=0$, then $a=0$ or $b=0$

Example: If $(x+3)(x+2)=0$, then $x+3=0$ and $x+2=0$

Use the Zero-Product Property to solve.

$$\textcircled{1} (x+8)(x-3)=0$$

$$\begin{array}{r} x+8=0 \\ -8 \quad -8 \\ \hline \end{array} \quad \begin{array}{r} x-3=0 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\textcircled{x=-8} \text{ and } \textcircled{x=3}$$

$$\textcircled{2} -4m(3m+4)=0$$

$$\begin{array}{r} -4m=0 \\ -4 \quad -4 \\ \hline \end{array} \quad \begin{array}{r} 3m+4=0 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\textcircled{m=0} \text{ and } \textcircled{m=-\frac{4}{3}}$$

Solve by factoring.

$$\textcircled{3} x^2-5x-14=0$$

$$(x+2)(x-7)=0$$

$$\begin{array}{r} x+2=0 \\ -2 \quad -2 \\ \hline \end{array} \quad \begin{array}{r} x-7=0 \\ +7 \quad +7 \\ \hline \end{array}$$

$$\textcircled{x=-2} \text{ or } \textcircled{x=7}$$

$$\textcircled{4} y^2+14y=-49$$

$$+49 \quad +49$$

$$y^2+14y+49=0$$

$$(y+7)(y+7)=0$$

$$\begin{array}{r} y+7=0 \\ -7 \quad -7 \\ \hline \end{array}$$

$$\textcircled{y=-7}$$

$$\textcircled{5} 5b^2=20b$$

$$-20b \quad -20b$$

$$5b^2-20b=0$$

$$5b(b-4)=0$$

$$\begin{array}{r} 5b=0 \quad b-4=0 \\ \frac{5}{5} \quad \frac{5}{5} \quad +4 \quad +4 \\ \hline \end{array}$$

$$\textcircled{b=0} \text{ and } \textcircled{b=4}$$