

## P.4 (b)

Example: Solve by factoring.  $x^2 + 7x + 12 = 0$

$$\begin{array}{r} \diagdown 12 \diagup \\ 3 \quad 4 \\ \diagup 7 \diagdown \end{array}$$

$$(x + 4)(x + 3) = 0$$

$$x = -4, x = -3$$

Example: Solve by taking the square root of each side.

$$16x^2 = 25$$

Isolate  $x^2$

$$x^2 = \frac{25}{16}$$

$$\sqrt{x^2} = \pm \sqrt{\frac{25}{16}}$$

$$x = \pm \frac{5}{4}$$

Example: Solve by completing the square.

$$x^2 + 10x = 4$$

$$x^2 + 10x + \underline{25} = 4 + \underline{25}$$

$$(x+5)(x+5) = 29$$

$$(x+5)^2 = 29$$

$$\sqrt{(x+5)^2} = \pm\sqrt{29}$$

$$x+5 = \pm\sqrt{29}$$

$$x = -5 \pm \sqrt{29}$$

① Move the constant to the right side.

② Divide the coef. of  $x$  by 2

$$\frac{10}{2} = 5$$

③ Square the number, add the result to both sides.

$$5^2 = 25$$

④ Factor the left side, simplify the right side.

⑤ Take the square root of both sides and solve for  $x$ .

Example: Solve by using the quadratic formula.

$$3x^2 - x - 5 = 0$$

$$\begin{array}{ccc} \uparrow & \uparrow & \uparrow \\ a & b & c \end{array}$$

$$x = \frac{1 \pm \sqrt{1 - (-60)}}{6}$$

$$x = \frac{1 \pm \sqrt{1 + 60}}{6}$$

$$x = \frac{1 \pm \sqrt{61}}{6}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 3$$

$$b = -1$$

$$c = -5$$

$$4(3)(-5) = (-60)$$