Completing the square of $ax^2+bx+c=0$

$a \neq 1$

ex.1 $3x^2-12x+11=0$

$3x^2-12x = -11$ → Factor the "a" value from the terms with x

$3(\boxed{x^2-4x+4}-4) = -11$ → complete square in ( )

tri sq.

$(\frac{-4}{2})^2 = 4$

$3(x^2-4x+4)-4(3) = -11$ → remove (−4) but MUST multiply by "a" → 3

FACTOR

$3(x-2)^2 - 12 = -11$ solve → (3.4 I)

$+12 \quad +12$

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

$(x-2)^2 = \frac{1}{3}$

$x-2 = \pm\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$ rationalize

$x-2 = \pm\frac{\sqrt{3}}{3}$

$\boxed{x = 2 \pm \frac{\sqrt{3}}{3}}$ EXACT

ex. 2 $-x^2-5x = 0$

$-(\boxed{x^2+5x+\frac{25}{4}}-\frac{25}{4}) = 0$ $(\frac{5}{2})^2 = \frac{25}{4}$

TRI SQ FACTOR

$-1 \times -\frac{25}{4}$

FACTOR $\quad -1 \times \frac{25}{4}$

$$-\left(x+\frac{5}{2}\right)^2+\frac{25}{4}=0$$

$$-\left(x+\frac{5}{2}\right)^2=-\frac{25}{4}$$

$$\left(x+\frac{5}{2}\right)^2=\frac{25}{4}$$

$$x+\frac{5}{2}=\pm\frac{5}{2}$$

$$x=-\frac{5}{2}\pm\frac{5}{2}$$

$$-\frac{5}{2}+\frac{5}{2}=0$$

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

ex.3 $\quad -5x^2-10x+2=0$ $\qquad \left(\frac{2}{2}\right)^2=1$

$$-5(\boxed{x^2+2x+1}-1)=-2$$

$$-5(x+1)^2+5=-2$$

$$-5(x+1)^2=-7$$

$$(x+1)^2=\frac{7}{5}$$

$$x+1=\pm\frac{\sqrt{7}}{\sqrt{5}}\times\frac{\sqrt{5}}{\sqrt{5}}$$

$$x+1=\pm\frac{\sqrt{35}}{5}$$

$$\boxed{x=-1\pm\frac{\sqrt{35}}{5}}$$

$$\frac{-5(x^2+2x\quad)}{-5}=\frac{-2}{-5}$$

$$x^2+2x+1-1=\frac{2}{5}$$

$$(x+1)^2-1+1=\frac{2}{5}+\frac{5}{5}$$

$$(x+1)^2=\frac{7}{5}$$

p 223 # 6, 10, 11bcd

p 223 # 9, 10, 11 DCA