transform the following equations:

$$y = (x + 5)(x + 1) \;\rightarrow\; y = ax^2 + bx + c$$

$$y = 3(x - 4)(x + 1) \;\rightarrow\; y = ax^2 + bx + c$$

$$y = -4(x - 1)(x + 3) \;\rightarrow\; y = ax^2 + bx + c$$

$$y = (x-1)^2 + 3 \;\rightarrow\; y = ax^2 + bx + c$$

$$y = 2(x-3)^2 + 1 \;\rightarrow\; y = ax^2 + bx + c$$

$$y = -3(x+2)^2 \;\rightarrow\; y = ax^2 + bx + c$$

$y = x^2 + 3x - 2 \ \rightarrow \ y = a(x-h)^2 + k$

$y = 2x^2 + 3x - 4 \ \rightarrow \ y = a(x-h)^2 + k$

$y = -2x^2 + 3x + 5 \;\rightarrow\; y = a(x-h)^2 + k$

$y = -2x^2 - x + 2 \;\rightarrow\; y = a(x-h)^2 + k$

$y = x^2 + 3x - 2 \ \rightarrow \ y = a(x - m)(x - n)$

$y = 2x^2 + 3x - 4 \ \rightarrow \ y = a(x - m)(x - n)$

$y = -2x^2 + 3x + 5 \ \rightarrow \ y = a(x - m)(x - n)$

$y = -2x^2 - x + 2 \ \rightarrow \ y = a(x - m)(x - n)$

transform the following equations:

$$y = (x+5)(x+1) \rightarrow y = ax^2 + bx + c$$

$$(x+5)(x+1) = (x+5)x + (x+5)$$

$$= x^2 + 5x + x + 5$$

$$\boxed{= x^2 + 6x + 5}$$

$$y = 3(x-4)(x+1) \rightarrow y = ax^2 + bx + c$$

$$3(x-4)(x+1) = (3x-12)(x+1)$$

$$= (3x-12)x + (3x-12)$$

$$= 3x^2 - 12x + 3x - 12$$

$$\boxed{= 3x^2 - 9x - 12}$$

$$y = -4(x-1)(x+3) \rightarrow y = ax^2 + bx + c$$

$$-4(x-1)(x+3) = (-4x+4)(x+3)$$

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

$$= -4x^2 + 4x - 12x + 12$$

$$\boxed{= -4x^2 - 8x + 12}$$

$y = (x-1)^2 + 3 \rightarrow y = ax^2 + bx + c$

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

$= (x-1)x - (x-1) + 3$

$= x^2 - x - x + 1 + 3$

$\boxed{= x^2 - 2x + 4}$

$y = 2(x-3)^2 + 1 \rightarrow y = ax^2 + bx + c$

$2(x-3)(x-3) + 1 = (2x-6)(x-3) + 1$

$= 2x^2 - 6x - 6x + 18 + 1$

$\boxed{= 2x^2 - 12x + 19}$

$y = -3(x+2)^2 \rightarrow y = ax^2 + bx + c$

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

$= (-3x-6)(x+2)$

$= -3x^2 - 6x - 6x - 12$

$\boxed{= -3x^2 - 12x - 12}$

$y = x^2 + 3x - 2 \rightarrow y = a(x-h)^2 + k$

$x^2 + 3x - 2 = ax^2 - 2hax + ah^2 + k$

x^2: $1 = a \Rightarrow a = 1$

x^1: $3 = -2ha \Rightarrow h = \frac{3}{-2[1]} = -\frac{3}{2} = -1.5$

x^0: $-2 = ah^2 + k \Rightarrow k = -2 - ah^2 = -2 - [1]\left[-\frac{3}{2}\right]^2$

$= -\frac{17}{4} = -4.25$

$$= \left(x + \tfrac{3}{2}\right)^2 - 4\tfrac{1}{4}$$

$y = 2x^2 + 3x - 4 \rightarrow y = a(x-h)^2 + k$

$2x^2 + 3x - 4 = ax^2 - 2hax + ah^2 + k$

x^2: $2 = a \Rightarrow a = 2$

x^1: $3 = -2ha \Rightarrow h = \frac{3}{-2[2]} = -\frac{3}{4}$

x^0: $-4 = ah^2 + k \Rightarrow k = -4 - ah^2 = -4 - [2]\left[-\frac{3}{4}\right]^2$

$= -\frac{41}{8} = -5\frac{1}{8}$

$$= 2\left(x + \tfrac{3}{4}\right)^2 - 5\tfrac{1}{8}$$

$y = -2x^2 + 3x + 5 \rightarrow y = a(x-h)^2 + k$

$-2x^2 + 3x + 5 = ax^2 - 2hax + ah^2 + k$

x^2: $-2 = a \Rightarrow a = -2$

x^1: $3 = -2ha \Rightarrow h = \frac{3}{-2[-2]} = \frac{3}{4}$

x^0: $5 = ah^2 + k \Rightarrow k = 5 - ah^2 = 5 - [-2]\left[\frac{3}{4}\right]^2$

$= \frac{49}{8} = 6.125$

$$= -2\left(x - \frac{3}{4}\right)^2 + 6\frac{1}{8}$$

$y = -2x^2 - x + 2 \rightarrow y = a(x-h)^2 + k$

$-2x^2 - x + 2 = ax^2 - 2hax + ah^2 + k$

x^2: $-2 = a \Rightarrow a = -2$

x^1: $-1 = -2ha \Rightarrow h = \frac{-1}{-2[-2]} = -\frac{1}{4}$

x^0: $2 = ah^2 + k \Rightarrow k = 2 - ah^2 = 2 - [-2]\left[-\frac{1}{4}\right]^2$

$= \frac{17}{8} = 2\frac{1}{8}$

$$= -2\left(x + \frac{1}{4}\right)^2 + 2\frac{1}{8}$$

$y = x^2 + 3x - 2 \rightarrow y = a(x - m)(x - n)$

$x^2 + 3x - 2 = a(x-m)(x-n) = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-[3] \pm \sqrt{[3]^2 - 4[1][-2]}}{2[1]}$$

$$= 0.5616, -3.5616$$

$$= (x - 0.5616)(x + 3.5616)$$

$y = 2x^2 + 3x - 4 \rightarrow y = a(x - m)(x - n)$

$2x^2 + 3x - 4 = a(x-m)(x-n) = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-[3] \pm \sqrt{[3]^2 - 4[2][-4]}}{2[2]}$$

$$= 0.8508, -2.3508$$

$$= 2(x - 0.8508)(x + 2.3508)$$

$y = -2x^2 + 3x + 5 \rightarrow y = a(x-m)(x-n)$

$-2x^2 + 3x + 5 = a(x-m)(x-n) = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-[3] \pm \sqrt{[3]^2 - 4[-2][5]}}{2[-2]}$$

$= -1, 2.5$

$$= -2(x+1)(x-2.5)$$

$y = -2x^2 - x + 2 \rightarrow y = a(x-m)(x-n)$

$-2x^2 - x + 2 = a(x-m)(x-n) = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-[-1] \pm \sqrt{[-1]^2 - 4[-2][2]}}{2[-2]}$$

$= -1.2808, 0.7808$

$$= -2(x+1.2808)(x-0.7808)$$