Harder Completing the Square

Write each of these expressions in the form $a(x+b)^2+c$

(a)

$2x^2+4x+1$

$=2[x^2+2x]+1$

$=2[(x+1)^2-1]+1$

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

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

(b)

$2x^2+8x-5$

$=2[x^2+4x]-5$

$=2[(x+2)^2-4]-5$

$=2(x+2)^2-8-5$

$=2(x+2)^2-13$

(c)

$2x^2-12x+9$

$=2[x^2-6x]+9$

$=2[(x-3)^2-9]+9$

$=2(x-3)^2-18+9$

$=2(x-3)^2-9$

(d)

$3x^2-6x+4$

$=3[x^2-2x]+4$

$=3[(x-1)^2-1]+4$

$=3(x-1)^2-3+4$

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

(e)

$2x^2-8x+3$

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

(f)

$3x^2+12x-2$

$=3(x+2)^2-14$

(g)

$2x^2+2x+11$

$=2\left(x+\frac{1}{2}\right)^2+\frac{21}{2}$

(h)

$3x^2-9x-7$

$=3\left(x-\frac{3}{2}\right)^2-\frac{55}{4}$

Write each of these expressions in the form $a-b(x+c)^2$

(i)

$5-4x-2x^2$

$=-2x^2-4x+5$

$=-2[x^2+2x]+5$

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

(j)

$7+8x-2x^2$

$=15-2(x-2)^2$

(k)

$14-6x-3x^2$

$=17-3(x+1)^2$

(l)

$9-12x-2x^2$

$=27-2(x+3)^2$