Write in the form $(x + p)^2 + q$

$x^2 + 6x - 4$

$(x + 3)^2 - 9 - 4$

$\underline{\underline{(x + 3)^2 - 13}}$

$(x + 3)(x + 3)$

$x^2 + 6x + 9$

Write in the form $(x + p)^2 + q$

$x^2 - 10x + 1$

$(x-5)^2 - 25 + 1$

$(x-5)^2 - 24$.

$(x-5)(x-5)$

$x^2 - 10x + 25$

Write in the form $a(x + p)^2 + q$

$3x^2 + 6x - 2$

$3\left[(x^2 + 2x)\right] - 2$

$3\left[(x+1)^2 - 1\right] - 2$

$(x+1)(x+1)$

$x^2 + 2x + 1$.

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

$3(x+1)^2 - 5$

Write in the form $a(x + p)^2 + q$

$4x^2 + 8x - 11$

$4\left[(x^2 + 2x)\right] - 11$

$4\left[(x+1)^2 - 1\right] - 11$

$(x+1)(x+1)$

$\underline{x^2 + 2x + 1}$

$4(x+1)^2 - 4 - 11$

$\underline{\underline{4(x+1)^2 - 15}}$

(a) Find the values of p and q such that

$$3x^2 + 5x + 1 = a(x + p)^2 + q$$

$$3\left[\left(x^2 + \frac{5}{3}x\right)\right] + 1$$

$$3\left[\left(x + \frac{5}{6}\right)^2 - \frac{25}{36}\right] + 1$$

$$\frac{5}{3} \div \frac{2}{1}$$

$$\frac{5}{3} \times \frac{1}{2}$$

$$3\left(x + \frac{5}{6}\right)^2 - \frac{75}{36} + \frac{36}{36}$$

$$\left(x + \frac{5}{6}\right)\left(x + \frac{5}{6}\right)$$

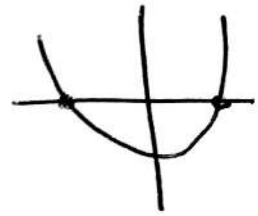
$$x^2 + \frac{10}{6}x + \frac{25}{36}$$

$$3\left(x + \frac{5}{6}\right)^2 - \frac{39}{36}$$

$$3\left(x + \frac{5}{6}\right)^2 - \frac{13}{12}$$

(b) Hence, or otherwise, solve the equation $3x^2 + 5x + 1 = 0$.

Give your answers in surd form.



$3\left(x+\frac{5}{6}\right)^2 - \frac{13}{12} = 0$

$\cancel{3}\left(x+\frac{5}{6}\right)^2 = \frac{13}{12}$

$\div\cancel{3}$ $\quad \left(x+\frac{5}{6}\right)^2 = \frac{13}{36}$ $\quad \div 3$

$\sqrt{}$ $\quad x+\frac{5}{6} = \pm\frac{\sqrt{13}}{6}$ $\quad \sqrt{}$

$x = -\frac{5}{6} \pm \frac{\sqrt{13}}{6}$

$x = \frac{-5+\sqrt{13}}{6}$ or $\frac{-5-\sqrt{13}}{6}$

$\frac{13}{12} \div 3$

$\frac{13}{12} \times \frac{1}{3} = \frac{13}{36}$

$\sqrt{\frac{13}{36}}$