Completing the Square : 1 : Answers

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

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

3) x^2-6x-2
$=(x-3)^2-9-2$
$=(x-3)^2-11$

4) $x^2+\frac{2}{3}x-1$
$=(x+\frac{1}{3})^2-\frac{1}{9}-1$
$=(x+\frac{1}{3})^2-\frac{10}{9}$

5) $x^2-\frac{3}{5}x+3$
$=(x-\frac{3}{10})^2-\frac{9}{100}+3$
$=(x-\frac{3}{10})^2+\frac{291}{100}$

6) $2x^2+4x-7$
$=2[x^2+2x-\frac{7}{2}]$
$=2[(x+1)^2-1-\frac{7}{2}]$
$=2[(x+1)^2-\frac{9}{2}]$
$=2(x+1)^2-9$

7) $2x^2-5x+1$
$=2[x^2-\frac{5}{2}x+\frac{1}{2}]$
$=2[(x-\frac{5}{4})^2-\frac{25}{16}+\frac{8}{16}]$
$=2[(x-\frac{5}{4})^2-\frac{17}{16}]$
$=2(x-\frac{5}{4})^2-\frac{17}{8}$

8) $3x^2+6x-2$
$=3[x^2+2x-\frac{2}{3}]$
$=3[(x+1)^2-1-\frac{2}{3}]$
$=3[(x+1)^2-\frac{5}{3}]$
$=3(x+1)^2-5$

9) $3x^2-2x+1$
$=3[x^2-\frac{2}{3}x+\frac{1}{3}]$
$=3[(x-\frac{1}{3})^2-\frac{1}{9}+\frac{3}{9}]$
$=3[(x-\frac{1}{3})^2+\frac{2}{9}]$
$=3(x-\frac{1}{3})^2+\frac{2}{3}$

10) $5x^2-10x+2$
$=5[x^2-2x+\frac{2}{5}]$
$=5[(x-1)^2-1+\frac{2}{5}]$
$=5[(x-1)^2-\frac{3}{5}]$
$=5(x-1)^2-3$

11) $5x^2 + 3x - 10$

$= 5\left[x^2 + \frac{3}{5}x - 2\right]$

$= 5\left[\left(x + \frac{3}{10}\right)^2 - \frac{9}{100} - \frac{200}{100}\right]$

$= 5\left[\left(x + \frac{3}{10}\right)^2 - \frac{209}{100}\right]$

$= 5\left(x + \frac{3}{10}\right)^2 - \frac{209}{20}$

12) $-2x^2 - 4x + 1$

$= -2\left[x^2 + 2x - \frac{1}{2}\right]$

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

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

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

13) $-3x^2 + 5x - 4$

$= -3\left[x^2 - \frac{5}{3}x + \frac{4}{3}\right]$

$= -3\left[\left(x - \frac{5}{6}\right)^2 - \frac{25}{36} + \frac{48}{36}\right]$

$= -3\left[\left(x - \frac{5}{6}\right)^2 + \frac{23}{36}\right]$

$= -3\left(x - \frac{5}{6}\right)^2 - \frac{23}{12}$

14) $-x^2 - 2x + 1$

$= -\left[x^2 + 2x - 1\right]$

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

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

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