① $(-7, -3)$ $(-2, 4)$

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{4+3}{-2+7} = \frac{7}{5}.$$

(x, y)
$(-2, 4)$ $\quad \frac{y-4}{x+2} = \frac{7}{5}.$ $\quad (x+2)\frac{7}{5}$

$$y - 4 = \frac{7}{5}x + \frac{14}{5}.$$

$$y = \frac{7}{5}x + \frac{34}{5}. \quad \text{or} \quad 5y = 7x + 34$$

2. $5x + 3y = 1$ $\quad \frac{3y}{3} = \frac{-5x}{3} + \frac{1}{3}$

$$y = -\frac{5}{3}x + \frac{1}{3}.$$

$$g = -\frac{5}{3}.$$

Perpendicular: $m_1 \times m_2 = -1$ $\quad -\frac{5}{3} \times m_2 = -1$

$$m_2 = \frac{3}{5}.$$

$\begin{pmatrix} x, y \\ -2, -6 \end{pmatrix}$

$$\frac{y+6}{x+2} = \frac{3}{5} \qquad \frac{3}{5}(x+2) = \frac{3}{5} + \frac{6}{5}.$$

$$y - 6 = \frac{3}{5}x + \frac{6}{5}.$$

$$y = \frac{3}{5}x + \frac{36}{5} \quad \text{OR} \quad 5y = 3x + 36.$$

3.

$x - y + z = 4$ --- ①

$2x - y + 3z = 8$ --- ②

$-2x + 2y - z = -9$ --- ③

step 1

Eqn 2 − Eqn 1

$$\begin{array}{r} 2x - y + 3z = 8 \\ x - y + z = 4 \\ \hline x + 2z = 4 \end{array} \quad -$$

$x + 2z = 4$ --- ④

$x = 4 - 2z$ $\quad \frac{2z}{2} = \frac{4-z}{2}$

$z = 2 + z/2$.

Eqn 3 + Eqn 2

$$\begin{array}{r} -2x + 2y - z = -9 \\ 2x - y + 3z = 8 \\ \hline y + 2z = -1 \end{array} \quad +$$

$y + 2z = -1$ --- ⑤

From eqn 4 and 5,

$2z = 4 - x$

$2z = -1 - y$ $\quad \therefore 4 - x = -1 - y$.

$5 + y = x$.

Eqn 1 + Eqn 3.

$$\begin{array}{r} x - y + z = 4 \\ -2x + 2y - z = -9 \\ \hline -x + y = -5. \end{array} \quad +$$

$-x + y = -5 \Rightarrow x = 5 + y$.

$y = x - 5$. $\quad x - 5 + 2z = -1$

$y = x - 5$.

∴ from eqn 1, $x - (x-5) + 2 + \frac{z}{2} = 4$

$x - x + 5 + 2 + \frac{z}{2} = 4 \Rightarrow -\frac{z}{2} = -3$ $\quad \boxed{x = 6}$

$x = 6$.

from eqn 4

$$x + 2z = 4$$

$$6 + 2z = 4$$

$$2z = -2$$

$$z = -1$$

From eqn 5.

$$y + 2z = -1$$

$$y + 2(-1) = -1$$

$$y - 2 = -1$$

$$y = 1$$

Therefore,

$x = 6$, $y = 1$, $z = -1$

4. $5x^2y - 180y$

$= 5y(x^2 - 36)$ $\qquad x^2 - 36 = (x+6)(x-6)$

$= 5y(x+6)(x-6)$

$= 5y(x+6)(x-6)$

5. $(6x^3 + 4x^2)(-9x - 6)$

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

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

6. $4u^4 - 9v^{64}$

$= \sqrt{4u^4} = 2u^2$ and $\sqrt{9v^{64}} = 3v^{32}$.

It is a difference of two squares.

ie, $(a+b)(a-b) = a^2 - b^2$

$= (2u^2)^2 - (3v^{32})^2 = (2u^2 + 3v^{32})(2u^2 - 3v^{32})$

$= (2u^2 + 3v^{32})(2u^2 - 3v^{32})$

7. $6x^2 - x - 15 = 0$

$P = -15 \times 6 = -90$

$S = -1$

N.O $= 9, -10$

$= (6x^2 + 9x)(-10x - 15) = 0$

$= (6x^2 + 9x)(-10x - 15) = 0$

$3x(2x+3) - 5(2x+3) = 0$

$(3x-5)(2x+3) = 0$

$3x - 5 = 0$ OR $2x + 3 = 0$

$\frac{3x}{3} = \frac{5}{3}$ $\frac{2x}{2} = \frac{-3}{2}$

$x = \frac{5}{3}$ OR $x = -\frac{3}{2}$.

8. Completing the square.

$x^2 + 6x - 3 = 0$

$x^2 + 6x = 3$

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

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

$(x+3)^2 = 12$. square root both sides.

$x + 3 = \pm\sqrt{12}$

$x = -3 \pm \sqrt{12}$

$\therefore \quad x = -3 \pm \sqrt{12}$. but $\sqrt{12} = 2\sqrt{3}$

~~OR~~

erefore, $x = -3 \pm 2\sqrt{3}$.

Implying that

$\therefore x = -3 + 2\sqrt{3}$ OR $x = -3 - 2\sqrt{3}$.

9. Quadratic formula.

$4x^2 = 7x - 5$.

$\Rightarrow 4x^2 - 7x + 5 = 0$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

$$\frac{7 \pm \sqrt{49 - (4 \times 4 \times 5)}}{8}.$$

$$= \frac{7 \pm \sqrt{-31}}{8} = \frac{7 \pm \sqrt{31}\,i}{8} = \frac{7}{8} \pm \frac{\sqrt{31}}{8}\,i$$

Therefore $x = \frac{7}{8} \pm \frac{\sqrt{31}}{8}\,i$ Implies that

$x = \frac{7}{8} + \frac{\sqrt{31}}{8}\,i$ OR $x = \frac{7}{8} - \frac{\sqrt{31}}{8}\,i$

10. $(5-6i) \div (4-3i)$

$\Rightarrow \frac{5-6i}{4-3i}$ Rationalize the denominator.

$$\frac{5-6i}{4-3i} \quad \frac{(4+3i)}{(4+3i)} = \frac{5(4+3i)-6i(4+3i)}{4^2-(3i)^2}$$

$$\frac{20+15i-24i-18i^2}{25} = \frac{20+15i-24i+18i}{25}$$

$$= \frac{38-9i}{25}$$

$$= \frac{38}{25} - \frac{9}{25}i$$