1 (i) $x^2 - 3x + 4 = 0$

$D = b^2 - 4ac$

$= (-3)^2 - 4 \times 1 \times 4$

$= 9 - 16$

$= -7$

$D < 0$ no real roots.

(ii) $2x^2 + x - 1 = 0$

$D = b^2 - 4ac$

$= 1^2 - 4 \times 2 \times (-1)$

$= 1 + 8$

$= 9$

$\because D > 0$

two distinct real roots

(iii) $2x^2 - 6x + \frac{9}{2} = 0$

$D = b^2 - 4ac$

$= (-6)^2 - 4 \times 2 \times \frac{9}{2}$

$= 36 - 36$

$= 0$

$\because D = 0$

roots real and equal

(iv) $3x^2 - 4x + 1 = 0$

$D = b^2 - 4ac$

$= (-4)^2 - 4 \times 3 \times 1$

$= 16 - 12$

$= 4$

$\because D > 0$

two distinct real roots

(v) $(x+4)^2 - 8x = 0$

$\Rightarrow x^2 + 16 + 8x - 8x = 0$

$\Rightarrow x^2 + 16 = 0$

$D = b^2 - 4ac$

$= 0^2 - 4 \times 1 \times 16$

$= -64$

$\because D < 0$ no real roots

(vi) $(x - \sqrt{2})^2 - 2(x+1) = 0$

$\Rightarrow x^2 + 2 - 2\sqrt{2}x - 2x - 2 = 0$

$\Rightarrow x^2 - (2\sqrt{2} + 2)x = 0$

$D = b^2 - 4ac$

$= \{-(2\sqrt{2}+2)\}^2 - 4 \times 1 \times 0$

$= (2\sqrt{2}+2)^2 - 0$

$D > 0$

two distinct real roots