

20) $2x^2 - 7x + 3 = 0$

comparing

$a = 2, b = -7, c = 3$

$D = b^2 - 4ac$

$= (-7)^2 - 4 \times 2 \times 3$

$= 49 - 24$

$= 25$

$x = \frac{-b + \sqrt{D}}{2a}, x = \frac{-b - \sqrt{D}}{2a}$

$= \frac{7 + \sqrt{25}}{2 \times 2}, = \frac{7 - \sqrt{25}}{2 \times 2}$

$= \frac{7 + 5}{4}, = \frac{7 - 5}{4}$

$= \frac{12}{4}, = \frac{2}{4}$

$= 3, = \frac{1}{2}$

\therefore roots are $\frac{1}{2}, 3$

21) $2x^2 + x - 4 = 0$

comparing

$a = 2, b = 1, c = -4$

$D = b^2 - 4ac$

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

$= 1 + 32$

$= 33$

$x = \frac{-b \pm \sqrt{33}}{2a}$

$= \frac{-1 \pm \sqrt{33}}{4}$ \therefore roots are $\frac{-1 \pm \sqrt{33}}{4}$

22) $4x^2 + 4\sqrt{3}x + 3 = 0$

comparing

$a = 4, b = 4\sqrt{3}, c = 3$

$D = b^2 - 4ac$

$= (4\sqrt{3})^2 - 4 \times 4 \times 3$

$= 48 - 48$

$= 0$

$x = \frac{-b + \sqrt{D}}{2a}, \frac{-b - \sqrt{D}}{2a}$

$= \frac{-4\sqrt{3} + 0}{2 \times 4}, \frac{-4\sqrt{3} - 0}{2 \times 4}$

$= \frac{-4\sqrt{3}}{8}, \frac{-4\sqrt{3}}{8}$

\therefore roots are $-\frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}$

23) $2x^2 + x + 4 = 0$

comparing

$a = 2, b = 1, c = 4$

$D = b^2 - 4ac$

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

$= 1 - 32$

$= -31$

$\therefore D < 0$

no real roots