



(viii) We have been given, $x^2 - 2x + 1 = 0$

Now we also know that for an equation $ax^2 + bx + c = 0$, the discriminant is given by the following equation:

$$D = b^2 - 4ac$$

Now, according to the equation given to us, we have, $a = 1$, $b = -2$ and $c = 1$.

Therefore, the discriminant is given as,

$$\begin{aligned} D &= (-2)^2 - 4(1)(1) \\ &= 4 - 4 \\ &= 0 \end{aligned}$$

Since, in order for a quadratic equation to have real roots, $D \geq 0$. Here we find that the equation satisfies this condition, hence it has real and equal roots.

Now, the roots of an equation is given by the following equation,

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

Therefore, the roots of the equation are given as follows,

$$\begin{aligned} x &= \frac{-(-2) \pm \sqrt{0}}{2(1)} \\ &= \frac{2}{2} \\ &= 1 \end{aligned}$$

Therefore, the roots of the equation are real and equal and its value is $\boxed{1}$.

(ix) We have been given, $2x^2 + 5\sqrt{3}x + 6 = 0$

Now we also know that for an equation $ax^2 + bx + c = 0$, the discriminant is given by the following equation:

$$D = b^2 - 4ac$$

Now, according to the equation given to us, we have, $a = 2$, $b = 5\sqrt{3}$ and $c = 6$.

Therefore, the discriminant is given as,

$$\begin{aligned} D &= (5\sqrt{3})^2 - 4(2)(6) \\ &= 75 - 48 \\ &= 27 \end{aligned}$$

Since, in order for a quadratic equation to have real roots, $D \geq 0$. Here we find that the equation satisfies this condition, hence it has real roots.

Now, the roots of an equation is given by the following equation,

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

Therefore, the roots of the equation are given as follows,

$$\begin{aligned} x &= \frac{-(5\sqrt{3}) \pm \sqrt{27}}{2(2)} \\ &= \frac{-5\sqrt{3} \pm 3\sqrt{3}}{4} \end{aligned}$$

Now we solve both cases for the two values of x . So, we have,

$$x = \frac{-5\sqrt{3} + 3\sqrt{3}}{4}$$

$$= \frac{-\sqrt{3}}{2}$$

Also,

$$x = \frac{-5\sqrt{3} - 3\sqrt{3}}{4}$$

$$= -2\sqrt{3}$$

Therefore, the roots of the equation are $\boxed{-\frac{\sqrt{3}}{2}}$ and $\boxed{-2\sqrt{3}}$.

(x) We have been given, $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

Now we also know that for an equation $ax^2 + bx + c = 0$, the discriminant is given by the following equation:

$$D = b^2 - 4ac$$

Now, according to the equation given to us, we have, $a = \sqrt{2}$, $b = 7$ and $c = 5\sqrt{2}$.

Therefore, the discriminant is given as,

$$D = (7)^2 - 4(\sqrt{2})(5\sqrt{2})$$

$$= 49 - 40 = 9$$

Since, in order for a quadratic equation to have real roots, $D \geq 0$. Here we find that the equation satisfies this condition, hence it has real roots.

Now, the roots of an equation is given by the following equation,

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

Therefore, the roots of the equation are given as follows,

$$x = \frac{-(7) \pm \sqrt{9}}{2(\sqrt{2})}$$

$$= \frac{-7 \pm 3}{2\sqrt{2}}$$

Now we solve both cases for the two values of x . So, we have,

$$x = \frac{-7 + 3}{2\sqrt{2}}$$

$$= -\sqrt{2}$$

Also,

$$x = \frac{-7 - 3}{2\sqrt{2}}$$

$$= -\frac{5}{\sqrt{2}}$$

Therefore, the roots of the equation are $\boxed{-\frac{5}{\sqrt{2}}}$ and $\boxed{-\sqrt{2}}$.

(xi) We have been given, $2x^2 - 2\sqrt{2}x + 1 = 0$

Now we also know that for an equation $ax^2 + bx + c = 0$, the discriminant is given by the following equation:

$$D = b^2 - 4ac$$

Now, according to the equation given to us, we have, $a = 2$, $b = -2\sqrt{2}$ and $c = 1$.

Therefore, the discriminant is given as,

$$D = (-2\sqrt{2})^2 - 4(2)(1)$$

$$= 8 - 8$$

$$= 0$$

Since, in order for a quadratic equation to have real roots, $D \geq 0$. Here we find that the equation satisfies this condition, hence it has real and equal roots.

Now, the roots of an equation is given by the following equation,

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

Therefore, the roots of the equation are given as follows,

$$x = \frac{-(-2\sqrt{2}) \pm \sqrt{0}}{2(2)}$$

$$= \frac{2\sqrt{2}}{4}$$

$$= \frac{1}{\sqrt{2}}$$

Therefore, the roots of the equation are real and equal and its value is $\boxed{\frac{1}{\sqrt{2}}}$.

(xii) We have been given, $3x^2 - 5x + 2 = 0$

Now we also know that for an equation $ax^2 + bx + c = 0$, the discriminant is given by the following equation:

$$D = b^2 - 4ac$$

Now, according to the equation given to us, we have, $a = 3$, $b = -5$ and $c = 2$.

Therefore, the discriminant is given as,

$$\begin{aligned} D &= (-5)^2 - 4(3)(2) \\ &= 25 - 24 \\ &= 1 \end{aligned}$$

Since, in order for a quadratic equation to have real roots, $D \geq 0$. Here we find that the equation satisfies this condition, hence it has real roots.

Now, the roots of an equation is given by the following equation,

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

Therefore, the roots of the equation are given as follows,

$$\begin{aligned} x &= \frac{-(-5) \pm \sqrt{1}}{2(3)} \\ &= \frac{5 \pm 1}{6} \end{aligned}$$

Now we solve both cases for the two values of x . So, we have,

$$\begin{aligned} x &= \frac{5+1}{6} \\ &= 1 \end{aligned}$$

Also,

$$\begin{aligned} x &= \frac{5-1}{6} \\ &= \frac{2}{3} \end{aligned}$$

Therefore, the roots of the equation are $\boxed{\frac{2}{3}}$ and $\boxed{1}$.

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