Quadratic Equations Ex 8.6 Q3

Answer :

(i) The given quadric equation is $2x^2+3x+k=0$, and roots are real.

Then find the value of *k*.

Here, $a=2, b=3 \text{and}, c=k$

As we know that $D=b^2-4ac$

Putting the value of $a=2, b=3 \text{and}, c=k$

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

$=9-8k$

The given equation will have real roots, if $D\geq 0$

$9-8k\geq 0$

$8k\leq 9$

$k\leq \frac{9}{8}$

Therefore, the value of $\boxed{k\leq \frac{9}{8}}$

(ii) The given quadric equation is $2x^2+kx+3=0$, and roots are real.

Then find the value of *k*.

Here, $a=2, b=k \text{and}, c=3$

As we know that $D=b^2-4ac$

Putting the value of $a=2, b=k \text{and}, c=3$

Putting the value of $a=2, b=k \text{ and}, c=3$

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

$=k^2-24$

The given equation will have real roots, if $D\geq 0$

$k^2-24\geq 0$

$k^2\geq 24$

$k\geq \sqrt{24} \text{ or } k\leq -\sqrt{24}$

$k\leq -2\sqrt{6} \text{ or } k\geq 2\sqrt{6}$

Therefore, the value of $\boxed{k\leq -2\sqrt{6} \text{ or } k\geq 2\sqrt{6}}$

(iii) The given quadric equation is $2x^2-5x-k=0$, and roots are real

Then find the value of *k*.

Here, $a=2, b=-5 \text{ and}, c=-k$

As we know that $D=b^2-4ac$

Putting the value of $a=2, b=-5 \text{ and}, c=-k$

$=(-5)^2-4\times 2\times(-k)$

$=25+8k$

The given equation will have real roots, if $D\geq 0$

$25+8k\geq 0$

$8k\geq -25$

$k\geq -\frac{25}{8}$

Therefore, the value of $\boxed{k\geq -\frac{25}{8}}$

(iv) The given quadric equation is $kx^2+6x+1=0$, and roots are real

Then find the value of *k*.

Here, $a=k, b=6 \text{ and}, c=1$

As we know that $D=b^2-4ac$

Putting the value of $a=k, b=6 \text{ and}, c=1$

$=(6)^2-4\times k\times 1$

$=36-4k$

The given equation will have real roots, if $D\geq 0$

$36-4k\geq 0$

$4k\leq 36$

$k\leq \frac{36}{4}$

$k\leq 9$

Therefore, the value of $\boxed{k\leq 9}$

(v) The given quadric equation is $x^2-kx+9=0$, and roots are real

Then find the value of *k*.

Here, $a=1, b=-k \text{ and}, c=9$

As we know that $D=b^2-4ac$

Putting the value of $a=1, b=-k \text{ and}, c=9$

$=(-k)^2-4\times1\times9$

$=k^2-36$

The given equation will have real roots, if $D\geq0$

$k^2-36\geq0$

$k^2\geq36$

$k\geq\sqrt{36}$ or $k\leq-\sqrt{36}$

$k\leq-6$ or $k\geq6$

Therefore, the value of $\boxed{k\leq-6 \text{ or } k\geq6}$

(vi) The given quadric equation is $2x^2+kx+2=0$, and roots are real.

Then find the value of *k*.

Here, $a=2,b=k \text{ and},c=2$

As we know that $D=b^2-4ac$

Putting the value of $a=2,b=k \text{ and},c=2$

$=(k)^2-4\times2\times2$

$=k^2-16$

The given equation will have real roots, if $D\geq0$

$k^2-16\geq0$

$k^2\geq16$

$k\geq\sqrt{16}$ or $k\leq-\sqrt{16}$

$k\leq-4$ or $k\geq4$

Therefore, the value of $\boxed{k\leq-4 \text{ or } k\geq4}$

(vii) The given quadric equation is $3x^2+2x+k=0$, and roots are real.

Then find the value of *k*.

Here, $a=3,b=2 \text{ and},c=k$

As we know that $D=b^2-4ac$

Putting the value of $a=3,b=2 \text{ and},c=k$

$=(2)^2-4\times3\times k$

$=4-12k$

The given equation will have real roots, if $D\geq0$

$4-12k\geq0$

$12k\leq4$

$k\leq\frac{4}{12}$

$\leq\frac{1}{3}$

Therefore, the value of $\boxed{k\leq\frac{1}{3}}$

(viii) The given quadric equation is $4x^2-3kx+1=0$, and roots are real.

Then find the value of *k*.

Here, $a=4,b=-3k \text{ and},c=1$

As we know that $D=b^2-4ac$

Putting the value of $a=4,b=-3k \text{ and},c=1$

$=(-3k)^2-4\times4\times1$

$=9k^2-16$

The given equation will have real roots, if $D \geq 0$

$$9k^2 - 16 \geq 0$$

$$9k^2 \geq 16$$

$$k^2 \geq \frac{16}{9}$$

$$k \geq \sqrt{\frac{16}{9}}$$

$$k \leq -\frac{4}{3} \text{ or } k \geq \frac{4}{3}$$

Therefore, the value of $\boxed{k \leq -\frac{4}{3} \text{ or } k \geq \frac{4}{3}}$

(ix) The given quadric equation is $2x^2 + kx - 4 = 0$, and roots are real

Then find the value of *k*.

Here, $a = 2, b = k \text{ and}, c = -4$

As we know that $D = b^2 - 4ac$

Putting the value of $a = 2, b = k \text{ and}, c = -4$

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

$$= k^2 + 32$$

The given equation will have real roots, if $D \geq 0$

$$k^2 + 32 \geq 0$$

Since left hand side is always positive. So $k \in R$

Therefore, the value of $\boxed{k \in R}$

********** END **********