

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 and, c = k

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

Putting the value of a = 2, b = 3 and, c = k

$$=(3)^2-4\times2\times k$$

$$=9-8k$$

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

$$9 - 8k \ge 0$$

$$8k \le 9$$

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

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

(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 and, c = 3

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

Putting the value of a = 2, b = k and, c = 3

Putting the value of a = 2, b = k and, c = 3

$$=(k)^2-4\times2\times3$$

$$=k^2-24$$

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

$$k^2 - 24 \ge 0$$

$$k^2 \ge 24$$

$$k \ge \sqrt{24}$$
 or $k \le -\sqrt{24}$

$$k \le -2\sqrt{6}$$
 or $k \ge 2\sqrt{6}$

Therefore, the value of $k \le -2\sqrt{6}$ or $k \ge 2\sqrt{6}$

(iii) The given quadric equation is $2x^2 - 5x - k = 0$, and roots are real Then find the value of k.

Here,
$$a = 2, b = -5$$
 and, $c = -k$

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

Putting the value of a = 2, b = -5 and, c = -k

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

$$=25+8k$$

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

$$25 + 8k \ge 0$$

$$8k ≥ -25$$

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

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

(iv) The given quadric equation is $kx^2 + 6x + 1 = 0$, and roots are real Then find the value of k.

Here,
$$a = k, b = 6$$
 and, $c = 1$

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

Putting the value of a = k, b = 6 and, c = 1

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

$$=36-4k$$

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

$$36-4k \ge 0$$

$$4k \le 36$$

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

$$k \leq 9$$

Therefore, the value of $k \le 9$

(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 and, c = 9

$$= (-k)^2 - 4 \times 1 \times 9$$
$$= k^2 - 36$$

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

$$k^2 - 36 \ge 0$$

$$k^2 \ge 36$$

$$k \ge \sqrt{36}$$
 or $k \le -\sqrt{36}$

$$k \le -6 \text{ or } k \ge 6$$

Therefore, the value of $k \le -6$ or $k \ge 6$

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

Then find the value of k.

Here,
$$a = 2, b = k$$
 and, $c = 2$

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

Putting the value of a = 2, b = k and, c = 2

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

$$=k^2-16$$

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

$$k^2 - 16 \ge 0$$

$$k^2 \ge 16$$

$$k \ge \sqrt{16}$$
 or $k \le -\sqrt{16}$

$$k \le -4 \text{ or } k \ge 4$$

Therefore, the value of $k \le -4$ or $k \ge 4$

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

Then find the value of k.

Here,
$$a = 3, b = 2$$
 and, $c = k$

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

Putting the value of a = 3, b = 2 and, c = k

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

$$=4-12k$$

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

$$4-12k \ge 0$$

$$12k \le 4$$

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

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

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

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

Then find the value of k.

Here,
$$a = 4, b = -3k$$
 and, $c = 1$

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

Putting the value of a = 4, b = -3k and, c = 1

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

$$=9k^2-16$$

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

$$9k^{2} - 16 \ge 0$$

$$9k^{2} \ge 16$$

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

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

$$k \le -\frac{4}{3} \text{ or } k \ge \frac{4}{3}$$

Therefore, the value of $k \le -\frac{4}{3}$ or $k \ge \frac{4}{3}$

(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 and, c = -4

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

Putting the value of a = 2, b = k and, c = -4

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

$$=k^2+32$$

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

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

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

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

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