X Test-9 MCQs

Quadratic Equations :-

1) Find the values of k for which the quadratic equation $k^2x^2 - 2(k-1)x + 4 = 0$ has real and equal roots

(a) $k = 0$ or $k = \frac{1}{3}$ (b) $k = 1$ or $k = \frac{1}{3}$ (c) $k = -1$ or $k = \frac{1}{3}$ (d) $k = -3$ or $k = \frac{1}{3}$

2) If -4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, find the value of p and q.

(a) $p = 3, q = 9$ (b) $p = 9, q = 3$ (c) $p = 3, q = \frac{4}{9}$ (d) $p = 3, q = \frac{9}{4}$

3) If the roots of the equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ are equal, then $b + c =$

(a) $2a$ (b) $2bc$ (c) $2c$ (d) none of these

4) Find the positive value of k for which the equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots

(a) 8 (b) 16 (c) -8 (d) -16

5) Find the positive value of k for which the equation $kx^2 - 6x - 2 = 0$ has real roots.

(a) $k \leq -\frac{9}{2}$ (b) $k \geq -\frac{9}{2}$ (c) $k > -\frac{9}{2}$ (d) $k < -\frac{9}{2}$

6) Find the positive value of k for which the equation $3x^2 + 2x + k = 0$ has real roots

(a) $k \geq \frac{1}{3}$ (b) $k \leq \frac{1}{3}$ (c) $k > \frac{1}{3}$ (d) $k < \frac{1}{3}$

7) Find the positive value of k for which the equation $2x^2 + kx + 2 = 0$ has real roots

(a) $k \geq 4$ (b) $k \leq -4$ (c) both (a) and (b) (d) none of these

8) The sum of a number and its reciprocal is $\frac{10}{3}$. Find the number.

(a) 3 (b) $\frac{1}{3}$ (c) both (a) and (b) (d) none of these

9) Divide 12 into two parts such that the sum of their squares is 74

(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

10) The sum of the squares of two consecutive natural numbers is 421. find the numbers.
(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these.

11) The sum of two numbers is 15 and the sum of their reciprocals is $\frac{3}{10}$. find the numbers
(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these

12) Divide 12 into two parts such that their product is 32.
(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

Pair of Linear Equations in two variables

1) The pair of equations $3x+4y=18$ and $4x+\frac{16}{3}y=24$ has
(a) infinite no. of solutions (b) unique solution
(c) no solution (d) cannot say anything

2) If the pair of equations $2x+3y=7$ and $kx+\frac{9}{2}y+12$ have no solution, then the value of k is:
(a) $\frac{2}{3}$ (b) -3 (c) 3 (d) $\frac{3}{2}$

3) The equations $x-y=0.9$ and $\frac{11}{x+y}=2$ have the solution:
(a) $x=5$ and $y=9$ (b) $x=3.2$ and $y=2.3$ (c) $x=3, y=2$ (d) none

4) If $bx+ay=a^2+b^2$ and $ax-by=0$, then the value of $x-y$ equals:
(a) $a-b$ (b) $b-a$ (c) a^2-b^2 (d) b^2+a^2

5) If $2x+3y=0$ and $4x-3y=0$, then $x+y$ equals:
(a) 0 (b) -1 (c) 1 (d) 2

6) If $\sqrt{a}\,x-\sqrt{b}\,y=b-a$ and $\sqrt{b}\,x-\sqrt{a}\,y=0$, then xy is
(a) $a+b$ (b) $a-b$ (c) $\sqrt{ab}$ (d) $-\sqrt{ab}$

7) If $\frac{2}{x}+\frac{3}{y}=13$ and $\frac{5}{x}-\frac{4}{y}=-2$, then $x+y=$
(a) $1/6$ (b) $-1/6$ (c) $5/6$ (d) $-5/6$

8) If $31x+43y=117$ and $43x+31y=105$, the value of $x+y$ is
(a) $1/3$ (b) -3 (c) 3 (d) $-1/3$

9) If $19x-17y=55$ and $17x-19y=53$, then the value of $x-y$ is (a) $1/3$ (b) -3 (c) 3 (d) 5.

10) If $\frac{x}{2}+y=0.8$ and $\frac{7}{\left(x+\frac{y}{2}\right)}=10$, then $x+y=$

(a) 1 (b) -0.8 (c) 0.6 (d) 0.5

11) If $(6,k)$ is a solution of the equation $3x+y-22=0$, then the value of k is

(a) 4 (b) -4 (c) 3 (d) -3

12) If $3x-5y=1$, $\frac{2x}{x-y}=4$, then the value of $x+y$ is

(a) $\frac{1}{3}$ (b) -3 (c) 3 (d) $-\frac{1}{3}$

13) If $3x+2y=13$ and $3x-2y=5$, then the value of $x+y=$

(a) 5 (b) 3 (c) 7 (d) none of these

14) If the pair of equations $2x+3y=5$ and $5x+\frac{15}{2}y=k$ represent two coincident lines, then the value of k is

(a) -5 (b) $-\frac{25}{2}$ (c) $\frac{25}{2}$ (d) $-\frac{5}{2}$

15) Rs 4900 were divided among 150 children. If each girl gets Rs 50 and a boy gets Rs 25, then the number of boys is

(a) 100 (b) 102 (c) 104 (d) 105.

X Test - 9

Quadratic Equations :-

1) Let the given equation be of the form $ax^2+bx+c=0$

Where $a=k^2, b=-2(k-1), c=4$

For real and equal roots, $b^2-4ac=0$

$\Rightarrow 4(k-1)^2-4\times k^2\times 4=0$

$\Rightarrow 4[k^2+1-2k-4k^2]=0$

$\Rightarrow -3k^2-2k+1=0$

$\Rightarrow 3k^2+2k-1=0$

$\Rightarrow 3k^2-k+3k-1=0$

$\Rightarrow k(3k-1)+(3k-1)=0$

$\Rightarrow (k+1)(3k-1)=0$

$\therefore k=-1, 1/3$ (c)

S P
2 −3 < −1, 3

2) Since -4 is a root of $x^2+px-4=0$,

then $(-4)^2+p\times(-4)-4=0$

$\Rightarrow 16-4p-4=0$

$\Rightarrow 12-4p=0$

$\Rightarrow 4p=12$

$p=3$ //

Then $x^2+px+q=0 \Rightarrow x^2+3x+q=0$

For equal roots, $b^2-4ac=0$

$3^2-4\times1\times q=0$

$9-4q=0$

$4q=9$

$q=\frac{9}{4}$ //

$\therefore p=3, q=\frac{9}{4}$ (d)

3) Let $(a-b)x^2+(b-c)x+(c-a)=0$ be of the form $Ax^2+Bx+C=0$;

Where $A=(a-b), B=(b-c); C=(c-a)$

For equal roots, $B^2-4AC=0$

$\Rightarrow (b-c)^2-4(a-b)(c-a)=0$

$\Rightarrow b^2+c^2-2bc-4(ac-a^2-bc+ab)=0$

$\Rightarrow b^2+c^2-2bc-4ac+4a^2+4bc-4ab=0$

$\Rightarrow 4a^2+b^2+c^2-4ab+2bc-4ac=0$

$\Rightarrow (-2a+b+c)^2=0 \Rightarrow -2a+b+c=0$

$\therefore b+c=2a$ (a)

4) For real roots, $b^2 - 4ac \geq 0$

when $x^2 + kx + 64 = 0$, $k^2 - 4 \times 64 \geq 0$

$k^2 - 256 \geq 0$

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

$k \leq -16$ or $k \geq 16$ $\leftrightarrow$ $k \geq 16$

When $x^2 - 8x + k = 0$, $64 - 4k \geq 0$

$-4k \geq -64$

$4k \leq 64$

$k \leq 16$

16 (b)

5) For real roots, $b^2 - 4ac \geq 0$

$36 + 4 \times k \times 2 \geq 0$

$36 + 8k \geq 0$

$8k \geq -36$

$k \geq -\frac{9}{2}$ (b)

6) For real roots, $b^2 - 4ac \geq 0$

$4 - 4 \times 3 \times k \geq 0$

$4 - 12k \geq 0$

$1 - 3k \geq 0$

$-3k \geq -1$

$3k \leq 1$

$k \leq \frac{1}{3}$ (b)

7) For real roots, $b^2 - 4ac \geq 0$

$k^2 - 4 \times 2 \times 2 \geq 0$

$k^2 - 16 \geq 0$

$k^2 - 4^2 \geq 0$

$k \leq -4$ or $k \geq 4$ (c)

8) Let the number be x.

ATQ, $x + \frac{1}{x} = \frac{10}{3}$

$\Rightarrow x^2 + 1 = \frac{10x}{3}$

$\Rightarrow 3x^2+3=10x$

$\Rightarrow 3x^2-10x+3=0$

$\Rightarrow 3x^2-x-9x+3=0$

$\Rightarrow x(3x-1)-3(3x-1)=0$

$\Rightarrow (x-3)(3x-1)=0$

$x=3, \frac{1}{3}$ (c)

S	P	
-10	9	-1, -9

9) Let the two parts be x and $12-x$

ATQ, $x^2+(12-x)^2=74$

$x^2+x^2+144-24x=74$

$2x^2-24x+70=0$

$x^2-12x+35=0$

$(x-7)(x-5)=0$

$x=7, 5$ (a)

S	P	
-12	35	-7, -5

10) Let the two consecutive natural no.s be x and $x+1$

ATQ, $x^2+(x+1)^2=421$

$x^2+x^2+2x+1=421$

$2x^2+2x-420=0$

$x^2+x-210=0$

$(x+15)(x-14)=0$

$x=-15, 14$

$\therefore$ The numbers are 14 and 15 (b)

S	P	
1	-210	15, -14

$210 = 7 \times 3 \times 5 \times 2$

11) Let the numbers be x and $15-x$

ATQ, $\frac{1}{x}+\frac{1}{15-x}=\frac{3}{10}$

$15-x+x=\frac{3}{10}(15-x)x$

$150=(45-3x)x$

$150=45x-3x^2$

$3x^2-45x+150=0$

$x^2-15x+50=0$

$(x-10)(x-5)=0$

$\therefore x=10, 5$ (c)

$350 = 5 \times 7 \times 10$

S	P	
-15	50	-10, -5

12) Let the two parts be x and $12-x$.

ATQ, $x(12-x)=32$

$12x-x^2=32$

$x^2 - 12x + 32 = 0$

$(x-8)(x-4) = 0$

$x = 8, 4$ (b)

S	P
-12	32
	∧
-8	-4

Linear Equations:-

1) $3x + 4y = 18$

$12x + 16y = 72$

Let the given eq:s be of the form $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$; where $a_1 = 3, b_1 = 4, c_1 = -18$

$a_2 = 12, b_2 = 16, c_2 = -72$

$$\frac{a_1}{a_2} = \frac{3}{12} = \frac{1}{4}$$

$$\frac{b_1}{b_2} = \frac{4}{16} = \frac{1}{4}$$

$$\frac{c_1}{c_2} = \frac{-18}{-72} = \frac{1}{4}$$

$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, infinite number of solutions (a)

2) $a_1 = 2, b_1 = 3, c_1 = -7$

$a_2 = k, b_2 = \frac{9}{2}, c_2 = -12$

For no solution, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$$\frac{2}{k} = \frac{3}{\frac{9}{2}} \neq \frac{-7}{-12}$$

$$\therefore \frac{2}{k} = \frac{6}{9}$$

$$k = \frac{2 \times 9}{6} = 3 \text{ (c)}$$

3) $x - y = 0.9 \rightarrow (1)$

$x + y = \frac{11}{2} \rightarrow (2)$

(1)+(2), $2x = 0.9 + 5.5$

$2x = 6.4$

$x = 3.2$

$y = 2.3$ (b)

4) $bx + ay = a^2 + b^2 \rightarrow (1)$
$ax - by = 0 \rightarrow (2)$

$(1) \times b$, $b^2x + aby = a^2b + b^3$
$(2) \times a$ $\quad a^2x - aby = 0$
$(+)$, $\quad x(b^2 + a^2) = b(a^2 + b^2)$
$x = b$ //

From eq: (2), $ab - by = 0$
$-by = -ab$
$y = a$ //

$\therefore x - y = b - a$ (b)

5) $2x + 3y = 0 \rightarrow (1)$
$4x - 3y = 0 \rightarrow (2)$
$(1) + (2)$, $6x = 0$
$x = 0$
From eq: (1), $y = 0$
$\therefore x + y = 0$ (a)

6) $\sqrt{a}x - \sqrt{b}y = b - a \rightarrow (1)$
$\sqrt{b}x - \sqrt{a}y = 0 \rightarrow (2)$

$(1) \times \sqrt{a}$, $ax - \sqrt{ab}y = \sqrt{a}(b - a)$
$(2) \times \sqrt{b}$, $bx - \sqrt{ab}y = 0$
$(-)$, $x(a - b) = \sqrt{a}(b - a)$ $\times -1$
$x = -\sqrt{a}$ //

From eq: (2), $-\sqrt{ab} - \sqrt{a}y = 0$
$-\sqrt{a}y = \sqrt{ab}$
$y = -\sqrt{b}$ //

$\therefore xy = \sqrt{ab}$ (c)

7) Put $\frac{1}{x} = a$, $\frac{1}{y} = b$

$2a + 3b = 13 \rightarrow (1)$
$5a - 4b = -2 \rightarrow (2)$
$(1) \times 4$, $8a + 12b = 52$
$(2) \times 3$ $\quad 15a - 12b = -6$
$(+)$, $\quad 23a = 46 \Rightarrow a = 2$ //

From eq: (1), $3b = 13 - 4$
$= 9$
$b = 3$ //

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

$\therefore x + y = \frac{1 \times 3}{2 \times 3} + \frac{1 \times 2}{3 \times 2} = \frac{5}{6}$
(c)

8) $31x + 43y = 117 \rightarrow (1)$

$43x + 31y = 105 \rightarrow (2)$

(1) + (2), $74x + 74y = 222$

$\div 74$, $x + y = 3$ (c)

9) $19x - 17y = 55 \rightarrow (1)$

$17x - 19y = 53 \rightarrow (2)$

$(1)+(2),\ 36x - 36y = 108$

$\div 36,\quad x - y = 3$ (c)

10) $\frac{x}{2} + y = 0.8 \rightarrow (1)$

$x + \frac{y}{2} = 0.7 \rightarrow (2)$

$(1)+(2),\ \frac{3}{2}x + \frac{3}{2}y = 1.5$

$x + y = 1.5 \times \frac{2}{3} = 0.5 \times 2 = 1$ (a)

11) When $x = 6, y = k$

$18 + k - 22 = 0$

$k - 4 = 0$

$k = 4$ (a)

12) $3x - 5y = 1 \rightarrow (1)$

$2x = 4x - 4y$

$\Rightarrow 2x - 4y = 0 \rightarrow (2)$

$(1) \times 2,\ 6x - 10y = 2$

$(2) \times 3,\ 6x - 12y = 0$

$(-),\quad 2y = 2$

$y = 1$

from eq :-(1)

$3x - 5 = 1$

$3x = 6$

$x = 2$

$\therefore x + y = 3$ (c)

13) $3x+2y=13 \rightarrow (1)$

$3x-2y=5 \rightarrow (2)$

$(1)+(2),\ 6x=18$

$x=3$ //

From eq:(1), $9+2y=13$

$2y=4$

$y=2$ //

$\therefore x+y=3+2=5$ (a)

14) $a_1=2, b_1=3, c_1=-5$

$a_2=5, b_2=\frac{15}{2}, c_2=-k$

For coincident lines, $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

$\Rightarrow \frac{2}{5}=\frac{3}{15/2}=\frac{-5}{-k}$

$\therefore \frac{2}{5}=\frac{5}{k}$

$k=\frac{25}{2}$ (c)

15) Let x be the no. of girls and y be the no. of boys.

$x+y=150 \rightarrow (1)$

$50x+25y=4900 \Rightarrow 2x+y=196 \rightarrow (2)$

$(1)-(2),\ -x=-46$

$x=46$

$y=150-46=104$ (c)