Chapter-1

(3 marks question)

Q.1 Express 20 as prime factors.

Solution: $20 = 2 \times 2 \times 5$

$= 2^2 \times 5^1$

$$\begin{array}{r|l} 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

Q.2 Express 156 as prime factors.

Solution: $156 = 2 \times 2 \times 3 \times 13$

$= 2^2 \times 3^1 \times 13^1$

$$\begin{array}{r|l} 2 & 156 \\ \hline 2 & 78 \\ \hline 3 & 39 \\ \hline & 13 \end{array}$$

Q.3 Find the LCM of 18 and 12 .

Solution: $18 = 2 \times 3 \times 3$

$= 2^1 \times 3^2$

$12 = 2 \times 2 \times 3$

$= 2^2 \times 3^1$

$$\begin{array}{r|l} 2 & 18 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

LCM = Product of the greatest power of each prime factor.

LCM = $3^2 \times 2^2 = 3 \times 3 \times 2 \times 2 = 36$

Q.4 Identify the rational and irrational numbers.

(i) $\frac{75}{2}$ (ii) $\sqrt{2}$ (iii) 0.375

Solution: rational numbers = $\frac{75}{2}$, 0.375

irrational number = $\sqrt{2}$

(4 marks question)

Q.5 Find the LCM of 8, 9 and 25.

Solution: $8 = 2 \times 2 \times 2 = 2^3$

$9 = 3 \times 3 = 3^2$

$25 = 5 \times 5 = 5^2$

LCM = Product of the greatest power of each prime factor involved in the numbers.

LCM = $2^3 \times 3^2 \times 5^2 = 8 \times 9 \times 25 = 1800$

Q.6 Find the HCF of 15, 12 and 21.

Solution: $15 = 3 \times 5 = 3^1 \times 5^1$

$12 = 2 \times 2 \times 3 = 2^2 \times 3^1$

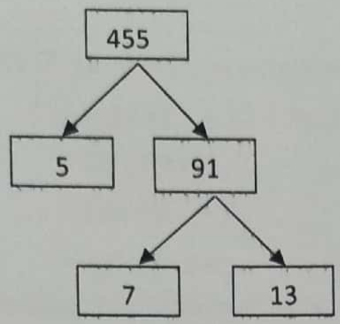
$21 = 3 \times 7 = 3^1 \times 7^1$

HCF = Product of the smallest power of each common prime factor in the numbers.

HCF = $3^1 = 3$ Ans.

Q.7 Express 455 as a product of prime factor (using factor tree method).

Solution:

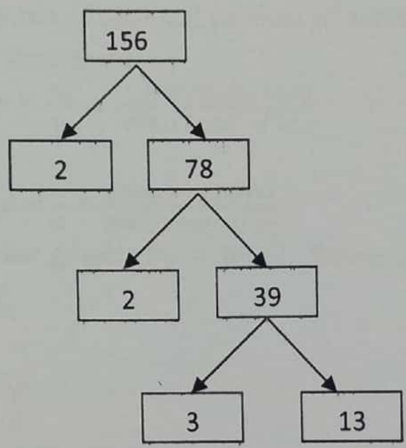


5	455
7	91
13	13
	1

$455 = 5\times 7\times 13$

Q.8 Express 156 as a product of prime factor (By using factor tree method).

Solution:



2	156
2	78
3	39
13	13
	1

$156 = 2\times2\times3\times13$

Q.9 Give that HCF (26,91) = 13, find LCM (26,91)

Solution: HCF × LCM = First number × Second number

$13 \times \text{LCM} = 26 \times 91$

$$\text{LCM} = \frac{26\times91}{13} = 182$$

LCM = 182

Q.10 Give that HCF (15,25) = 5, find LCM (15,25)

Solution: HCF × LCM = First number × Second number

$5 \times \text{LCM} = 15 \times 25$

$$\text{LCM} = \frac{15\times25}{5} = 75$$

LCM = 75

Q.11 Find the HCF and LCM of 6,72 and 120, using the prime factorization method.

Solution: $6 = 2\times3 = 2^1\times3^1$

$72 = 2\times2\times2\times3\times3 = 2^3\times 3^2$

$120 = 2\times2\times2\times3\times5 = 2^3\times3^1\times5^1$

HCF $= 2^1\times3^1 = 6$

$\text{LCM} = 2^3\times 3^2\times5^1 = 2\times 2\times 2\times 3\times3\times5 = 360$

LCM = 360

2	72
2	36
2	18
3	9
3	3
	1

2	120
2	60
2	30
3	15
5	5
	1

Q.12 Explain why $7\times11\times13+13$ is composite number.

Solution: $7\times11\times13+13 = 13\,(7\times11+1)$

$= 13\,(77+1)$

$= 13\times78$

$= 13\times13\times3\times2$

2	78
3	39
13	13
	1

It is product of prime numbers.

$\therefore$ $7\times11\times13+13$, is composite number

Chapter-2

(3 marks questions)

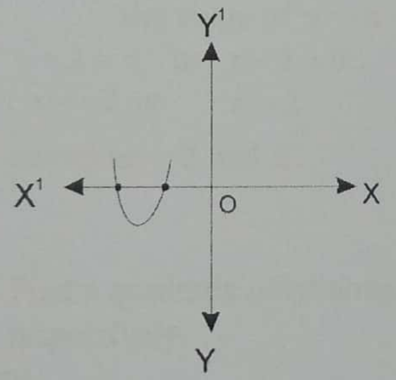
Q.1 Write the formula of sum and product of zeroes of quadratic polynomial ax^2+bx+c whose zeros are α and β .

$$\alpha+\beta=\frac{-b}{a}=\frac{-(\,coefficient\ of\ x)}{coefficient\ of\ x^2}$$

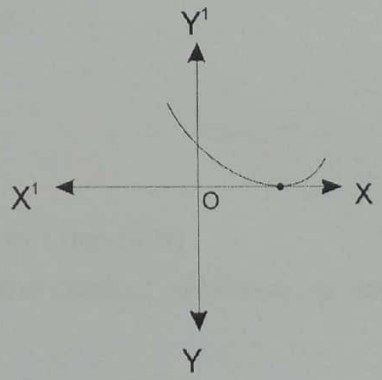
$$\alpha\beta=\frac{c}{a}=\frac{(constant\ term)}{coefficient\ of\ x^2}$$

Q.2 Given below the graph of $y=p\,(x)$, Where $p(x)$ is a polynomial. Find the number of zeros of $p(x)$.

(i)



(ii)



Solution:

(i) The number of zeroes is 2 as the graph intersects the $x-axis$ at two points.

(ii) The number of zeroes is 1 as the graph intersects the $x-axis$ at one point only.

Q.3 Find the zeroes of the quadratic polynominal $x^2+7x+10$.

Solution: $x^2+7x+10$

$= x^2+5x+2x+10$

$= x(x+5)+2(x+5)$

$= (x+5)(x+2)$

So the value of $x^2+7x+10$ is zero when

$x+5=0$ or $x+2=0$

$\therefore$ $x=-5$ or $x=-2$

The zeroes of $x^2+7x+10$ are -5 and -2 .

Q.4 Find the zeroes of the quadratic polynomial x^2-2x-8 .

Solution: x^2-2x-8

$= x^2-4x+2x-8$

$= x(x-4)+2(x-4)$

$= (x-4)(x+2)$

So the value of x^2-2x-8 is zero when

$x-4=0$ or $x+2=0$

$x=4$ or $x=-2$

The zeroes of quadratic polynomial x^2-2x-8 are 4 and -2 .

Q.5 Find the sum and product of zeroes of the polynomial whose zeroes are 4 and -2.

Zeroes are $\alpha=4$ and $\beta=-2$

Sum of zeroes $\alpha+\beta=4-2=2$

Product of zeroes $\alpha\beta=4\times-2=-8$

Q.6 Find the zeroes of the quadratic polynomial x^2-4

Solution: x^2-4

$=(x^2)-(2)^2$

$=(x+2)(x-2)$

The value of x^2-4 is zero when

$x+2=0$ or $x-2=0$

$x=-2$ or $x=2$

zeroes are -2 and 2.

(4 marks Question)

Q.7 Find a quadratic polynomial, the sum and product of whose zeroes are -3 and 2 respectively.

Solution:

let α and β are zeroes of the quadratic polynomial.

$$\therefore \alpha+\beta=-3=\frac{-b}{a}$$

$$\alpha.\beta=2=\frac{c}{a} \qquad \Rightarrow \qquad \text{If } a=1 \text{ then } b=3 \text{ and } c=2$$

$\therefore$Quadratic polynomial. $= ax^2+bx+c = x^2+3x+2$

Q.8 Find sum and product of zeroes of a quadratic polynomial x^2-9 .

Solution: x^2-9

$=(x)^2-(3)^2$

$=(x+3)(x-3)$

$x+3=0$ or $x-3=0$

$x=-3$ or $x=3$

Zeroes are -3 and 3

Sum of zeroes $=-3+3=0$

Product of zeroes $=-3\times3=-9$

Q.9 Find a quadratic polynomial, the sum and product of whose zeros are 1 and -1 respectively.

Solution: let α and β are zeroes of a quadratic polynomial.

$$\therefore\ \alpha+\beta=\frac{-b}{a}=1$$

$$\alpha.\beta=\frac{c}{a}=1 \quad\Rightarrow\quad \text{if } a=1 \text{ then } b=-1 \text{ and } c=1$$

$\therefore$ Quadratic polynomial $=ax^2+bx+c=x^2-x+1$

Q.10 Find the sum and product of the zeroes of x^2+7x-3 .

Solution: Sum of zeroes $=\alpha+\beta=\dfrac{-(coefficeient\ of\ x)}{(coefficeient\ of\ x^2)}=\dfrac{-7}{1}$

Product of zeroes $=\alpha.\beta=\dfrac{(constant\ term)}{(coefficeient\ of\ x^2)}=\dfrac{-3}{1}$

Q.11 Find the zeroes of the quadratic polynomial $6x^2-7x-3$ and verify the relationship between the zeroes and the co-efficients.

Solution: $6x^2-7x-3$

$=6x^2-9x+2x-3$

$=3x(2x-3)+1(2x-3)$

$=(3x+1)(2x-3)$

The value of $6x^2-7x-3$ is zero when

$3x+1=0$ or $2x-3=0$

$3x=-1$ or $2x=3$

$x=\dfrac{-1}{3}$ or $x=\dfrac{3}{2}$

$\therefore$Sum of zeroes $=\alpha+\beta=\dfrac{3}{2}-\dfrac{1}{3}=\dfrac{9-2}{6}=\dfrac{7}{6}$

also Sum of zeroes $=\dfrac{-b}{a}=\dfrac{-(-7)}{6}=\dfrac{7}{6}$

$\therefore$ Product of zeroes $=\alpha.\beta=\dfrac{3}{2}\times\dfrac{-1}{3}=\dfrac{-1}{2}$

also Product of zeroes $=\dfrac{c}{a}=\dfrac{-3}{6}=-\dfrac{1}{2}$

Q.12 Which of the following are the quadratic polynomials.

(i) $2y^2-3y+4$ (ii) $\dfrac{1}{x-1}$

(iii) $x^2-4x-\sqrt{2}$ (iv) $\sqrt{3}x+2x^2+1$

A polynomials of degree 2 is called quadratic polynomial.

$\therefore$ (i) (iii) and (iv) are quadratic polynomial.

Chapter-3

(3 marks question)

Q.1 In equation $x+y=10$ if $x=2$ then find value of y .

Solution: Given $x+y=10$

Put value of x

$$2+y=10$$

$$y = 10 - 2 = 8$$

$\therefore$ value of y = 8

Q.2 In equation $2x+3y=14$,If $y=2$ then find the value of x .

Solution: $2x+3y=14$

Put value of y

$$2x+3(2)=14$$

$$2x+6=14$$

$$2x=14-6=8$$

$$x=\frac{8}{2}=4$$

$\therefore$ value of x = 4

Q.3 By comparing the coefficients of the pairs of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ define algebraically, the types of solution of these linear equations .

Solution: (i) If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ then unique soluton.

(ii) If $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ then infinitely many solutions.

(iii) If $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ then no solution.

Q.4 In equations $5x+7y+12=0$ and $4x+8y+5=0$, write the value of $a_1, a_2, b_1, b_2, c_1, c_2$

Solution: $a_1 = 5$ and $a_2 = 4$

$b_1 = 7$ $b_2 = 8$

$c_1 = 12$ $c_2 = 5$

Q.5 In equations $2x+3y=8$ and $4x+6y=9$, write the value of $a_1, a_2, b_1, b_2, c_1, c_2$

Solution: $a_1 = 2$ and $a_2 = 4$

$b_1 = 3$ $b_2 = 6$

$c_1 = 8$ $c_2 = 9$

Q.6 Find out whether the pair of linear equations $5x+4y+8=0$ and $7x+6y+9=0$ has unique solution or not?

Solution: $\frac{a_1}{a_2} = \frac{5}{7}$, $\frac{b_1}{b_2} = \frac{4}{6}$ and $\frac{c_1}{c_2} = \frac{8}{9}$

$\because \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$\therefore$ equations has unique solution

(4 marks Questions)

Q.7 Solve the pair of equations $x+y=5$ and $x-y=15$

Solution: On adding the given equations

$$x+y=5$$
$$x-y=15$$
$$2x=20$$
$$x=\frac{20}{2}=10$$
$$x=10$$

Now $x+y=5$

$10+y=5$ (put value of x)

$$y=5-10$$
$$y=-5$$

$\therefore$ $x=10$ and $y=-5$

Q.8 Solve the pair of equations $x+3y=6$ and $2x-3y=12$

Solution: On adding the given equations

$$x+3y=6$$
$$2x-3y=12$$
$$3x \quad =18$$
$$x=\frac{18}{3}=6$$

Now $x+3y=6$

$6+3y=6$ (put value of x)

$$3y=6-6=0$$
$$y=\frac{0}{3}=0$$
$$y=0$$

$\therefore$ $x=6$ and $y=0$

Q.9 On comparing the ratio of coefficient of pair of equations $5x+6y+7=0$ and $7x+12y+8=0$, find the nature of solution.

Solution: $5x+6y+7=0$

$$7x+12y+8=0$$

$$\frac{a_1}{a_2}=\frac{5}{7}, \quad \frac{b_1}{b_2}=\frac{6}{12}=\frac{1}{2}, \quad \frac{c_1}{c_2}=\frac{7}{8}$$

Here $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$

$\therefore$ It has unique solution .

Q.10 5 pencil and 7 pen together cost ₹ 50, Whereas 7 pencil and 5 pens together cost ₹ 46. Find the cost of one pencil and that of one pen.

Solution: Let cost of one pencil = ₹ x

cost of one pen = ₹ y

∴ According to question: $5x + 7y = 50$

$7x + 5y = 46$

On solving

$(5x+7y=50) \times 7$

$(7x+5y=46) \times 5$

$35x+49y=350$

$35x+25y=230$

$-\quad -\quad -$

$24y=120$

∴ $y=\frac{120}{24}=5$

Put $y=5$ in equation $5x+7y=50$, we get

$5x=50-35$

$5x=15$

$x=\frac{15}{5}=3$

∴ cost of one pencil = ₹3

cost of one pen = ₹5

Q.11 The cost of 5 oranges and 3 apples is ₹35 and the cost of 2 oranges and 4 apples is ₹ 28. Find the cost of an orange and an apple.

Solution: Let cost of an orange = ₹ x

cost of an apple = ₹ y

According to question:

$5x+3y=35)]\times 2$

$2x+4y=28)]\times 5$

$10x+6y=70$

$10x+20y=140$

$-\quad -\quad -$

$\cancel{-}14y=\cancel{-}70$

$y=\frac{70}{14}=5$

Put $y=5$ in equation $5x+3y=35$, we get

$$5x+3(5)=35$$

$$5x+15=35$$

$$5x=35-15=20$$

$$x=\frac{20}{5}=4$$

$\therefore$ cost of an orange = ₹4

cost of an apple = ₹5

Q.12 For which value of p does the pair of equations given below has unique solutions?

$4x+py+8=0$ and $2x+2y+2=0$

Solution: $\frac{a_1}{a_2}=\frac{4}{2}=\frac{2}{1}$, $\frac{b_1}{b_2}=\frac{p}{2}$, $\frac{c_1}{c_2}=\frac{8}{2}=\frac{4}{1}$

For unique solution: $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$

$$\frac{2}{1}\neq\frac{p}{2}$$

$$p\neq 4$$

Q.13 The difference between two numbers is 26 and one number is three times the other. Find them.

Solution: Let one number $= x$

second number $= y$

according to question : $x-y=26----(i)$

and $x=3y----(ii)$

put the value of x in (i) we get

$$3y-y=26$$

$$2y=26$$

$$y=\frac{26}{2}=13$$

put value of y in equation $x-y=26$

$$x-13=26$$

$$x=26+13=39$$

$\therefore$ first number = 39

second number = 13

Chapter-4

(3 marks question)

Q.1 (i) Write the standard form of a quadratic equation.

(ii) Write the formula of discriminant 'D' of the quadratic equation.

Solution: (i) $ax^2+bx+c=0$ where $a\neq 0$

(ii) $D=b^2-4ac$

Q.2 Check whether $(x+1)^2=7$ is quadratic equations?

Solution: $(x+1)^2=7$

$x^2+2x+1=7$

$x^2+2x+1-7=0$

$x^2 + 2x - 6 = 0$

highest power of $x = 2$

$\therefore (x+1)^2 = 7$ is a quadratic equation.

Q.3 Check whether $x^2 - 2x = -x(3-x)$ is a quadratic equation?

Solution: $x^2 - 2x = -x(3-x)$

$x^2 - 2x = -3x + x^2$

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

$x = 0$

highest power of $x = 1$

$\therefore$ $x^2 - 2x = -x(3-x)$ is not a quadratic equation.

Q.4 Find the roots of the quadratic equation $x^2 - 3x - 10 = 0$ by factorisation.

Solution: $x^2 - 3x - 10 = 0$

$x^2 - 5x + 2x - 10 = 0$

$x(x-5) + 2(x-5) = 0$

$(x-5)(x+2) = 0$

$x - 5 = 0$ or $x + 2 = 0$

$x = 5$ or $x = -2$

$x = 5, -2$

$\therefore$ roots of the quadratic equation are 5 and -2.

Q.5 Find the discriminant of the quadratic equation $x^2 + 5x + 2 = 0$

Solution: $x^2 + 5x + 2 = 0$

$ax^2 + bx + c = 0$ (standard form)

$\therefore$ $a = 1, b = 5, c = 2$

$D = b^2 - 4ac$

$= (5)^2 - 4(1)(2)$

$= 25 - 8 = 17$

$D = 17$

Q.6 Write the conditions of nature of roots of $ax^2 + bx + c = 0$

Solution: For quadratic equation $ax^2 + bx + c = 0$

$D = b^2 - 4ac$

(1) if $b^2 - 4ac > 0$ then two distinct real roots.

(2) if $b^2 - 4ac = 0$ then two equal real roots.

(3) if $b^2 - 4ac < 0$ then no real roots.

Q.7 Are the roots of quadratic equation $x^2 - 2x + 1 = 0$ equal?

Solution: $x^2 - 2x + 1 = 0$

$ax^2 + bx + c = 0$

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

$D = b^2 - 4ac$

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

$= 4 - 4 = 0$

Here $D = 0$ $\therefore$ roots are real and equal.

Q.8 Are roots of the quadratic equation $y^2 - 11y + 30 = 0$ are real?

Solution: $y^2 - 11y + 30 = 0$

$ay^2 + by + c = 0$

$a = 1, b = -11, c = 30$

$D = b^2 - 4ac$

$= (-11)^2 - 4(1)(30)$

$= 121 - 120 = 1$

$\because D > 0$

$\therefore$ roots are real

(4 marks Question)

Q.9 Do roots of the quadratic equation $2x^2 - 7x + 3 = 0$ exist?

Solution: $2x^2 - 7x + 3 = 0$

$ax^2 + bx + c = 0$

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

$D = b^2 - 4ac$

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

$= 49 - 24 = 25$

$D > 0$ $\therefore$ roots are real and they exist.

Q.10 Find the nature of the roots of quadratic equation $(x-2)^2 = 0$ and find them.

Solution: $(x-2)^2 = x^2 - 4x + 4 = 0$

$D = b^2 - 4ac$

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

$16 - 16 = 0$

$D = 0$

$\therefore$ roots are real and equal

$(x-2)^2 = 0$

$(x-2)(x-2) = 0$

$x - 2 = 0$ or $x - 2 = 0$

$x = 2$ or $x = 2$

$x = 2, 2$

$\therefore$ roots are $2, 2$

Q.11 Find the roots of equation $3x^2 - 5x + 2 = 0$ by using quadratic formula.

Solution: $3x^2 - 5x + 2 = 0$

$$ax^2+bx+c=0$$
$$a=3, b=-5, c=2$$
$$D=b^2-4ac$$
$$=(-5)^2-4(3)(2)$$
$$=25-24=1$$

Now $\qquad x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

$$=\frac{-(-5)\pm\sqrt{1}}{2(3)}$$
$$=\frac{5\pm1}{6}$$
$$x=\frac{5+1}{6}=\frac{6}{6}=1 \quad , \quad x=\frac{5-1}{6}=\frac{4}{6}=\frac{2}{3}$$
$$x=1, \ \frac{2}{3}$$

Q.12 Find the roots of quadratic equation $x^2-2x-8=0$

Solution: $\qquad x^2-2x-8=0$

$$a=1, b=-2, c=-8$$
$$D=(b)^2-4ac$$
$$=(-2)^2-4(1)(-8)$$
$$=4+32=36$$
$$x=\frac{-b\pm\sqrt{D}}{2a}=\frac{2\pm\sqrt{36}}{2\times1}=\frac{2\pm6}{2}$$
$$x=\frac{2+6}{2}=\frac{8}{2}=4 \ , \ x=\frac{2-6}{2}=\frac{-4}{2}=-2$$

The roots of quadratic equation $x^2-2x-8=0$ are 4 and -2 .

Q.13 Find the roots of the quadratic equation $2x^2+x-6=0$, if possible?

Solution: $\qquad 2x^2+x-6=0$

$$a=2, b=1, c=-6$$
$$D=b^2-4ac$$
$$=(1)^2-4(2)(-6)$$
$$=1+48=49$$

$D>0 \ \therefore$ roots are real

$$x=\frac{-b\pm\sqrt{D}}{2a}=\frac{-1\pm\sqrt{49}}{2(2)}=\frac{-1\pm7}{4}$$
$$x=\frac{-1+7}{4}=\frac{6}{4}=\frac{3}{2} \quad , \quad x=\frac{-1-7}{4}=\frac{-8}{4}=-2$$

$\therefore$ roots are $\frac{3}{2}$ and -2.

Q.14 Find two consecutive odd positive integers, sum of whose squares is 290.

Solution: Let the smaller of the two consecutive odd positive integers be x then the second integer will be $x+2$.

According to the question:

$$(x)^2+(x+2)^2=290$$

$$x^2+x^2+4x+4=290$$

$$2x^2+4x+4-290=0$$

$$2x^2+4x-286=0$$

$$2(x^2+2x-143)=0$$

$$2\neq 0$$

$$\therefore x^2+2x-143=0$$

$$x^2+13x-11x-143=0$$

$$x(x+13)-11(x+13)=0$$

$$(x+13)(x-11)=0$$

$x+13=0$ or $x-11=0$

$x=-13$ or $x=11$

$x=-13$ rejected ($\because$numbers are positive integers)

$\therefore\ x=11$

First number $=11$

Second number $=11+2=13$

Q.15 If roots of the quadratic equation $x^2+2x+k=0$ are equal then find the value of k.

Solution: $x^2+2x+k=0$

$$ax^2+bx+c=0$$

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

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

$$=(2)^2-4(1)(k)$$

$$=4-4k$$

$\because$ Roots are equal $\therefore b^2-4ac=0$

or $4-4k=0$

or $4=4k$

or $\frac{4}{4}=k$

$\therefore$ $1=k$

$\therefore$ value of $k=1$

Q.16 If roots of the quadratic equation $2x^2+kx+3=0$ are equal then find the value of k.

Solution: $2x^2+kx+3=0$

$ax^2+bx+c=0$

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

$D=b^2-4ac$

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

$=k^2-24$

$\because$ Roots are equal $\therefore$ D = 0

$k^2-24=0$

$k^2=24$

$k^2=4\times 6$

$k=\pm\sqrt{4\times 6}$

$k=\pm 2\sqrt{6}$

value of $k=\pm 2\sqrt{6}$

Chapter - 5

(3 marks question)

Q.1 Fill in the boxes from AP: $-3, 0, 3, 6, 9$ ....

$a_1 = \boxed{}$

$a_2 = \boxed{}$

$a_3 = \boxed{}$

$a_6 = \boxed{}$

Solution: $a_1=-3$, $a_2=0$, $a_3=3$, $a_6=12$

Q.2 For the AP: $1, 3, 5, 7$ .... write the first term, 5th term and the common difference.

Solution: $a_1=1$

$a_5=9$

Common difference $d= a_2 - a_1 = 3-1=2$

Q.3 For the AP: $0, 5, 10, 15$........ write the first term,third term and sixth term.

Solution: $a_1=0$

$a_3=10$

$a_6=25$

Q.4 If $a_1=10$ and $d=10$ write the first term, third term and forth term.

Solution: $a_1=10$ $d=10$

$a_2=10+10=20$

$a_3=10+20=30$

$a_4=10+30=40$

Q.5 For a given AP ,find the missing number ?

-4, $\boxed{}$, $0, 2,$ $\boxed{}$ $6,$ $\boxed{}$ $10 - - - -$

Solution: (i) $= -2$

(ii) $= 4$

(iii) $= 8$

Q.6 Write the nth term of AP: $a_1, a_2, a_3, - - - - - a_n$ if $a_1 = a$ and common difference is d.

Solution: n^{th} term $a_n = a + (n-1)d$

Q.7 Write the 10^{th} term of an AP: 2, 4, 6, 8 ....

Solution: $a_1 = 2$, $a_2 = 4$, $a_3 = 6$

$d = a_2 - a_1 = 4 - 2 = 2$

$a_n = a + (n-1)d$

$a_{10} = 2 + (10-1)2$

$= 2 + 9(2)$

$= 2 + 18 = 20$

$\therefore$ 10^{th} term =20

Q.8 Write the first four term of an A.P, where $a = 4$ and $d = -3$.

Solution: $a_1 = 4$,

$d = -3$

$a_1 = 4$

$a_2 = a + d = 4 + 1(-3) = 4 - 3 = 1$

$a_3 = a + 2d =$ 4+2 (-3) $= 4 - 6 = -2$

$a_4 = a + 3d =$ 4+3 (-3) $= 4 - 9 = -5$

First four term of the A.P = 4,1, -2, -5

(4 marks Questions)

Q.9 Which term of an A.P: 3, 8, 13, 18...........is 78 ?

Solution: $a_1 = 3$, last term $a_n = 78$

$d = 8 - 3 = 5$

$a_n = a + (n-1)d$

$78 = 3 + (n-1)5$

$78 = 3 + 5n - 5$

$78 - 3 + 5 = 5n$

$80 = 5n$

$\frac{80}{5} = n$

$16 = n$

78 is the 16^{th} term

Q.10 Find the number of terms in an AP: $7, 13, 19 \ldots\ldots 205$

Solution: $a = 7$, $a_n = 205$

$$d = 13 - 7 = 6$$

$$a_n = a + (n-1)d$$

$$205 = 7 + (n-1)6$$

$$205 = 7 + 6n - 6$$

$$205 - 7 + 6 = 6n$$

$$204 = 6n$$

$$\frac{204}{6} = n$$

$$\therefore\ 34 = n$$

34 terms in given AP.

Q.11 Determine the A.P whose 3rd term is 5 and the 7th term is 9.

Solution: $a_3 = a + 2d = 5$

$$a_7 = a + 6d = 9$$

Substract $\quad - \quad - \quad -$

$$-4d = -4$$

$$d = \frac{-4}{-4} = 1$$

Put value of d in $a + 2d = 5$

$$a + 2(1) = 5$$

$$a + 2 = 5$$

$$a = 5 - 2 = 3$$

$\therefore$ A.P : $3, 4, 5, 6, 7 \ldots\ldots$

Q.12 Find the sum of the first 10 terms of an AP: $2, 4, 6, 8 \ldots\ldots 20$.

Solution: $a = 2$

$d = 4 - 2 = 2$, $\quad n = 10$

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$= \frac{10}{2}[2 \times 2 + (10-1)2]$$

$$= 5[4 + (9 \times 2)]$$

$$= 5[4 + 18]$$

$$= 5 \times 22 = 110$$

$\therefore$ Sum of 10 terms of an AP = 110

Q.13 Find the sum of the first 7 terms of an AP: $10, 20, 30, 40, \ldots\ldots$

Solution: $a = 10$

$d = 20 - 10 = 10$

$n = 7$

$S_n = \frac{n}{2}[2a + (n-1)d]$

$= \frac{7}{2}[2 \times 10 + (7-1)10]$

$= \frac{7}{2}[20 + 60]$

$= \frac{7}{2} \times 80 = 40$

$= 280$

$\therefore$ Sum of the 7 terms of an AP = 280

Q.14 Write the first 4 term of an A.P : $a_n = 1 + n$

Put value $n = 1, 2, 3, 4$ in $a_n = 1 + n$

Solution:

$a_1 = 1 + 1 = 2$

$a_2 = 1 + 2 = 3$

$a_3 = 1 + 3 = 4$

$a_4 = 1 + 4 = 5$

$\therefore$ The first 4 term of an A.P: $2, 3, 4, 5$

Q.15 Write the terms of an AP: $a_n = 5 + n$ and 10th term also.

Solution: $a_n = 5 + n$

Put $n = 1, 2, 3$

$a_1 = 5 + 1 = 6$

$a_2 = 5 + 2 = 7$

$a_3 = 5 + 3 = 8$ ....

and $a_{10} = 5 + 10 = 15$

$\therefore$ AP: 6,7,8.......... and $a_{10} = 15$ Ans.

Q.16 Find the sum of the first 5 multiple of 8.

Solution: Multiples of 8 = 8,16,24,32,40 ....

$a = 8$

$d = 16 - 8 = 8$

$n = 5$

$Sn = \frac{n}{2}[2a + (n-1)d]$

$S_5 = \frac{5}{2}[2 \times 8 + (5-1)8]$

$= \frac{5}{2}[16 + 4 \times 8]$

$$= \frac{5}{2}[16+32]$$

$$= \frac{5}{\cancel{2}} \times \overset{24}{\cancel{48}}$$

$$= 120$$

$\therefore$ Sum of first 5 multiple of 8 $=120$

Chapter-6

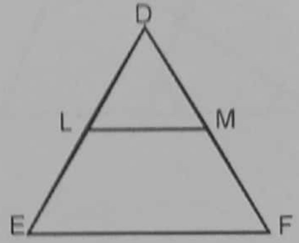
(3 marks question)

Q.1 State Thales Theorem

If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points ,the other two sides are divided in the same ratio.

Q.2 In ΔDEF, $LM \parallel EF$

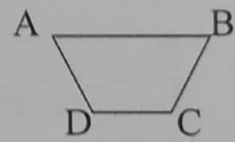
Acc. to Thales theorem,



$$\frac{DL}{\square} = \frac{\square}{MF}$$ (Fill in the blank)

Answer: $\frac{DL}{LE} = \frac{DM}{MF}$

Q.3 From the figure ,trapezium ABCD write the parallel and non-parallel sides.

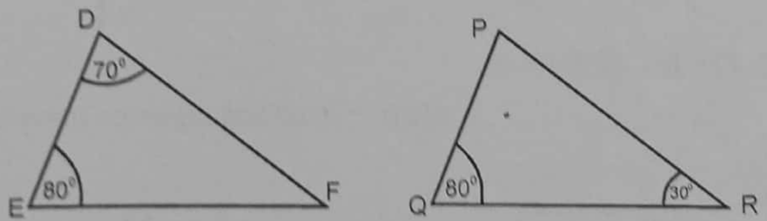


Answer: parallel sides: AB and DC

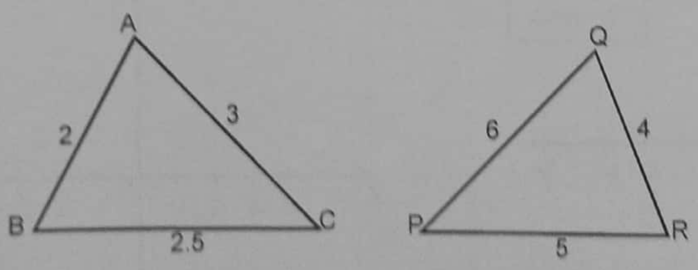
non-parallel sides: AD and BC

Q.4 Write the following similar triangles in symbolic form.

(i)



(ii)

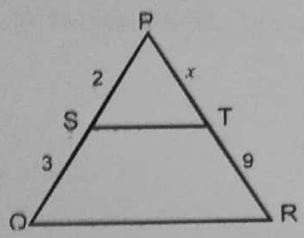


Answer: (i) $\Delta DEF \sim \Delta PQR$

(ii) $\Delta ABC \sim \Delta QRP$

(4 marks Question)

Q.5 In figure ΔPQR ,If $ST \parallel QR$ then find x .



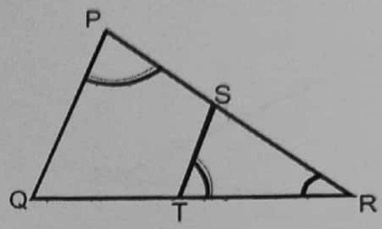
Solution: In ΔPQR , $ST \parallel QR$

$\therefore$ Acc. to Thales theorem,

$\frac{PS}{SQ} = \frac{PT}{TR} \Rightarrow \frac{2}{3} = \frac{x}{9}$ or $3x = 2 \times 9$

$$x = \frac{2 \times 9}{3} = 6$$

Q.6 S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$ Show that $\Delta RPQ \sim \Delta RTS$.



Solution: In ΔPQR

$\angle P = \angle RTS$ (given)

$\therefore$ Now in ΔRPQ and ΔRTS

$\angle R = \angle R$ (common)

$\angle P = \angle RTS$ (given)

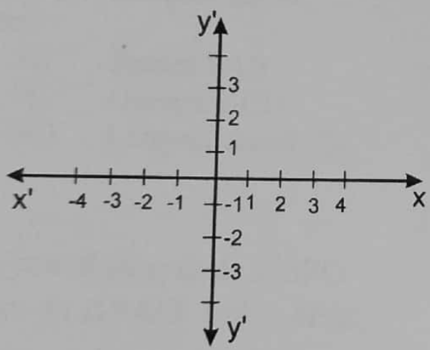
$\therefore$ Acc. to AA rule of similarity

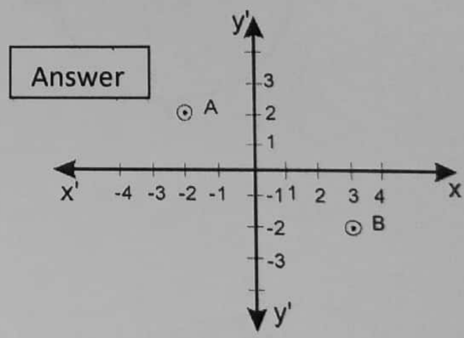
$\Delta RPQ \sim \Delta RTS$

Chapter-7

(3 marks question)

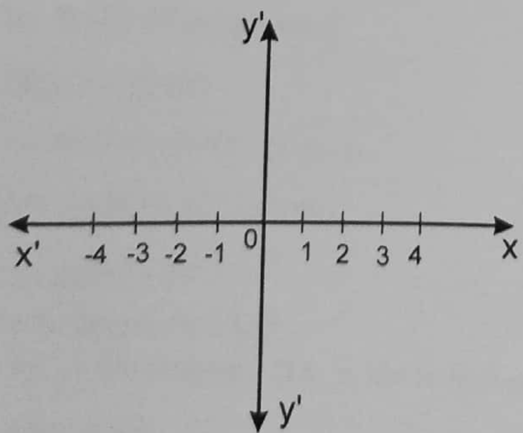
Q.1 Plot any point in second and fourth quadrant.

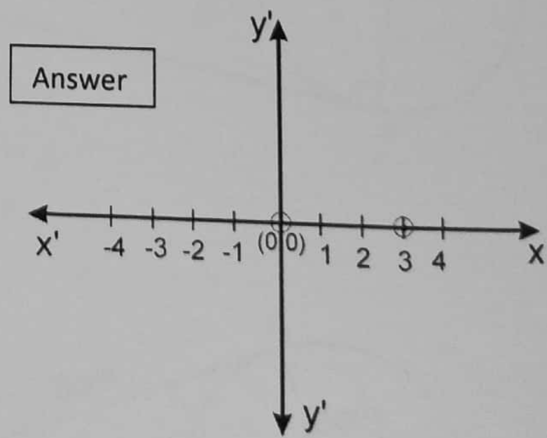




A = (-2,2) , B = (3,-2)

Q.2 Plot the point on origin and on $x - axis$





Origin: $(0,0)$, $x - axis$: $(3,0)$

Q.3 Find the distance between the point $P(1,2)$ and $Q(3,4)$

$$\overline{PQ} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(3-1)^2 + (4-2)^2}$$

$$= \sqrt{(2)^2 + (2)^2}$$

$$= \sqrt{4+4} = \sqrt{8} = \sqrt{4 \times 2} = 2\sqrt{2}$$

Q.4 If a point $X(x, y)$ divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ in the ratio m:n

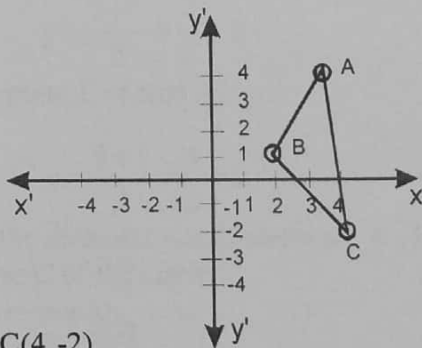
and $x = \dfrac{mx_2 + nx_1}{m+n}$ then find $y = ?$

Answer: $y = \dfrac{my_2 + ny_1}{m+n}$

Q.5 Write the formula to find the distance between points $A(x_1, y_1)$ and $B(x_2, y_2)$

Answer: $\overline{AB} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

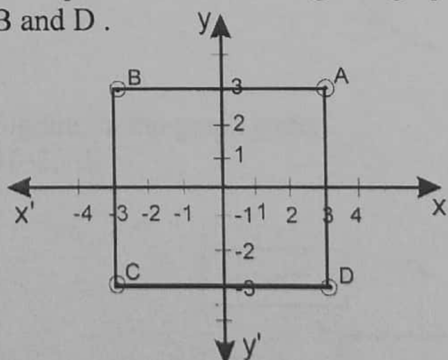
Q.6 Plot three points on a graph paper such that on joining the points, it becomes triangle.



Answer: A(3,4) , B(2,1) , C(4,-2)

(4 marks Question)

Q.7 The co-ordinates of a point C of a square ABCD on the given graph paper are (-3, -3) , then find the co-ordinates of A, B and D .



Answer: Co-ordinates of A,B and D are respectively A (3, 3), B (−3, 3), D (3, −3)

Q.8 Find the abscissa of a point which divides the line segment joining the points $A(1,7)$ and $B(5,3)$ in the ratio 2:3 internally.

Answer: $x = \frac{mx_2+nx_1}{m+n}$

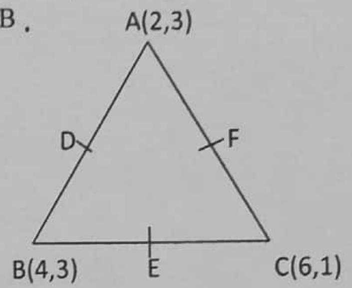
$$x = \frac{2(5)+3(1)}{2+3}$$

$$x = \frac{10+3}{5}$$

$$x = \frac{13}{5}$$

Q.9 If a $\Delta\, ABC$ whose vertices are A(2,3);B(4,3) &C(6,1) then find the co-ordinates of the mid points D,E and F of sides AB, BC and AC respectively.

Solution: Co-ordinates of mid point D of side AB .



$$x = \frac{x_1+x_2}{2} = \frac{2+4}{2} = \frac{6}{2} = 3$$

$$y = \frac{y_1+y_2}{2} = \frac{3+3}{2} = \frac{6}{2} = 3$$

$\therefore$ D(3,3)

Co-ordinates of mid point E of side BC

$$x = \frac{4+6}{2} = \frac{10}{2} = 5\ , \quad y = \frac{3+1}{2} = \frac{4}{2} = 2$$

Co-ordinates of mid point F of side AC

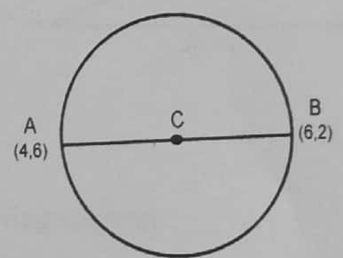
$$x = \frac{2+6}{2} = \frac{8}{2} = 4\ , \quad y = \frac{3+1}{2} = \frac{4}{2} = 2$$

Q.10 The co-ordinates of the diameter AB of circle are A (4,6) and B (6,2) then find the co-ordinates of the centre C of the circle.

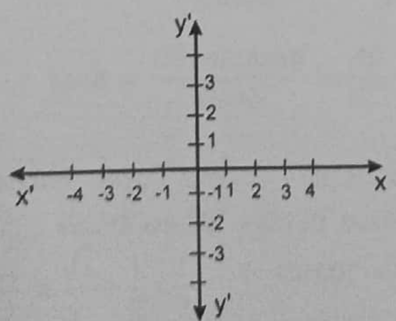
Answer: $C(x,y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$$= \left(\frac{4+6}{2}, \frac{6+2}{2}\right)$$

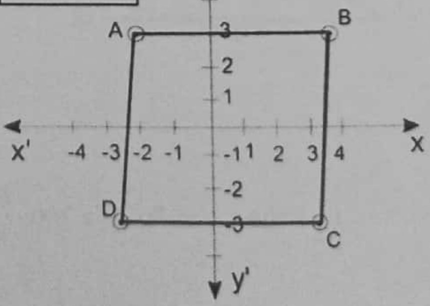
$$= \left(\frac{10}{2}, \frac{8}{2}\right) = (5,4)$$



Q.11 Plot the vertices of the parallelogram on the graph paper.
A(−2,3), B(4,3), C(3,−3) D(−3,−3)



Answer



Chapter-8

(3 marks question)

Q.1 Evaluate $5\sin^2\theta + 5\cos^2\theta$

Solution: $5\sin^2\theta + 5\cos^2\theta$

$= 5(\sin^2\theta + \cos^2\theta)$ $(\because \sin^2\theta + \cos^2\theta = 1)$

$= 5 \times 1 = 5$

Q.2 Evaluate $2\tan^2 45^0$

Solution: $2\tan^2 45^0$

$= 2(1)^2$ $(\because \tan 45^0 = 1)$

$= 2 \times 1 \times 1 = 2$

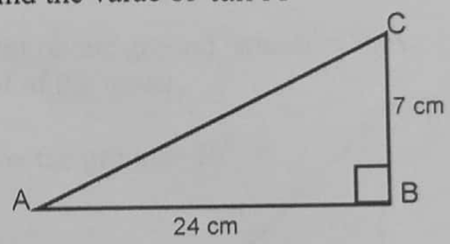
Q.3 Evaluate $4\sin 30^0 \cos 60^0$

Solution: $4\sin 30^0 \cos 60^0$

$= 4 \times \frac{1}{2} \times \frac{1}{2}$ $\quad (\because \sin 30^0 = \frac{1}{2}, \cos 60^0 = \frac{1}{2})$

$= 1$

Q.4 In ΔABC right angled at B, $AB = 24\text{cm}, BC = 7\text{cm}$ find the value of tan A .



Solution: In ΔABC, $\angle B = 90^0$

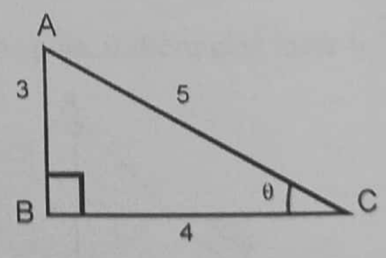
$$\because \tan A = \frac{Base}{Perpendicular}$$

$$= \frac{AB}{BC} = \frac{24}{7}$$

(4 marks question)

Q.5 Find the value of $\cos\theta$, $\tan\theta$, $\sin\theta$ from the following diagram.

Solution:



$$\cos\theta = \frac{Base}{Hypotenuse} = \frac{BC}{AC} = \frac{4}{5}$$

$$\tan\theta = \frac{Perpendicular}{Base} = \frac{AB}{BC} = \frac{3}{4}$$

$$\sec\theta = \frac{Hypotenuse}{Base} = \frac{AC}{BC} = \frac{5}{4}$$

Q.6 Evaluate $\sin 60^0 \cos 30^0 + \sin 30^0 \cos 60^0$

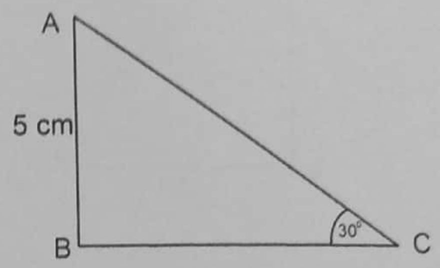
Solution: $\sin 60^0 \cos 30^0 + \sin 30^0 \cos 60^0$

$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times \frac{1}{2}$ $\quad (\because \sin 60^o = \cos 30^o = \frac{\sqrt{3}}{2}$ *and* $\sin 30^o = \cos 60^o = \frac{1}{2})$

$=\frac{3}{4}+\frac{1}{4}$

$=\frac{3+1}{4}=\frac{4}{4}=1$

Q.7 In a right angled ΔABC, right angled at B, $AB=5cm$ and $\angle ACB=30^0$ (see fig.) .Determine the length of side BC.



Solution: In , right angled ΔABC, $\angle B=90^0$

$\angle ACB = 30^o and\ AB = 5cm$

$\therefore \frac{AB}{BC}=\tan 30^0$

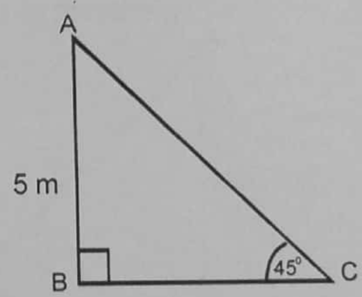
or $\frac{5}{BC}=\frac{1}{\sqrt{3}}$ $(\because \tan 30^0=\frac{1}{\sqrt{3}})$

$\therefore BC=5\sqrt{3}cm$

Chapter-9

(4 marks question)

Q.1 In given figure $AB=5\,m$, find BC.

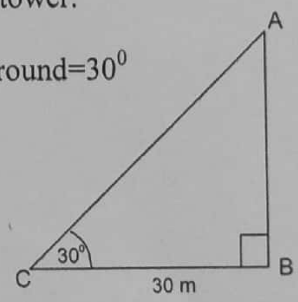


Solution: In right angle ΔABC, $\angle B=90^0, \angle C=45^0$ and $AB=5cm$

$\therefore \frac{AB}{BC}=\tan 45^0$ or $\frac{5}{BC}=1$ $(\because \tan 45^0=1)$

$\therefore BC=5\ \ m$

Q.2 The angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of the tower, is 30^0. Find the height of the tower.



Solution: Let height of tower $=AB$

Angle of elevation of top of the tower from point C on the ground$=30^0$

Distance of point C from foot of tower = 30m

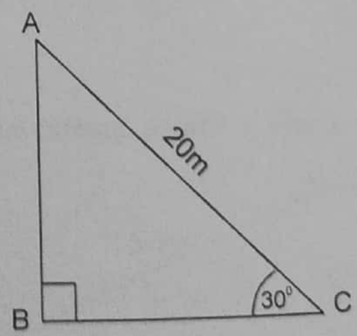
In right angle ΔABC

$\frac{AB}{BC}=\tan 30^0$

or $\frac{AB}{30}=\frac{1}{\sqrt{3}}$ or $AB=30\times\frac{1}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}=\frac{30\sqrt{3}}{3}=10\sqrt{3}\ m$

$\therefore$ Height of the tower $=10\sqrt{3}\ m$

Q.3 A circus artist is climbing a 20m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angled made by the rope with the ground level is 30^0.



Solution: Length of the rope $AC=20m$

Angle of elevation top of pole $\angle C=30^0$

Height of pole$=AB$

In right angle ΔABC

$\frac{AB}{AC}=\sin 30^0$ or $\frac{AB}{20}=\frac{1}{2}$ $\because (\sin 30^0=\frac{1}{2})$

$\therefore AB=\frac{1}{2}\times 20=10m$

$\therefore$ Height of pole = 10m

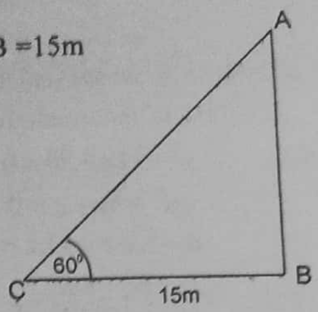
Q.4 A tower stands vertically on the ground. From a point on the ground which is 15m a way from the foot of the tower, the angle of elevation of the top of the tower is 60^0. Find the height of the tower.

Solution: Let AB represent the tower.

The distance of the point from the foot of the tower CB =15m

angle of elevation $\angle ACB = 60^0$

$\therefore$ in right angled ΔABC



$$\frac{AB}{BC} = \tan 60^0$$

$$\frac{AB}{15} = \sqrt{3} \qquad (\because \tan 60^0 = \sqrt{3})$$

$$\therefore AB = 15\sqrt{3}m$$

$\therefore$ Height of the tower = $15\sqrt{3}$ m

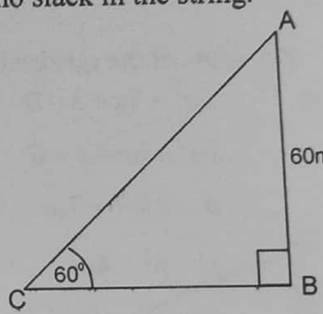
Q.5 A kite is flying at height of 60m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60^0. Find the length of the string, assuming that there is no slack in the string.

Solution: Let AC represents lenght of the string

The height of kite = 60m

Angle of elevation of the kite = 60^0

$\therefore AB = 60m, \angle ACB = 60^0$



In right angled ΔABC

$$\frac{AC}{AB} = \operatorname{cosec} 60^0$$

or $$\frac{AC}{60} = \frac{2}{\sqrt{3}} \qquad (\sin 60^0 = \frac{\sqrt{3}}{2}, \operatorname{cosec} 60^0 = \frac{2}{\sqrt{3}})$$

or $$AC = 60 \times \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{120\sqrt{3}}{3} = 40\sqrt{3}m$$

$\therefore$ Length of the string $= 40\sqrt{3}$m

Chapter-10

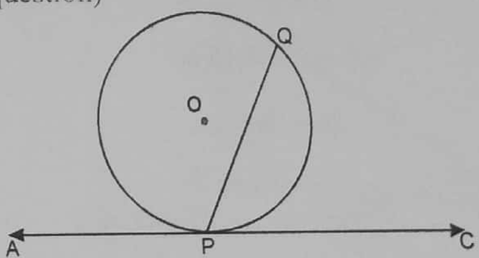
(3 marks question)

Q.1 From figure, write the following:

(i) Name of the tangent

(ii) Point of contact

(iii) Name of the chord



Solution:

(i) Tangent AC

(ii) Contanct point P

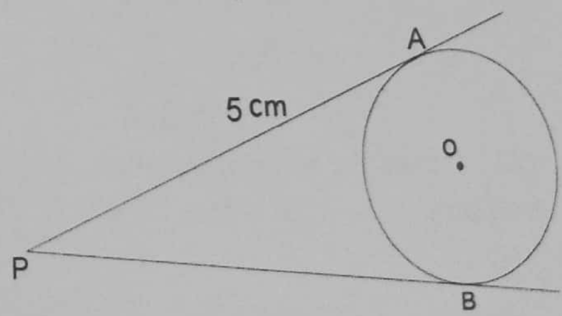
(iii) Chord PQ

Q.2 In given figure, length of the tangent PA is 5cm from the external point P to circle. Find the length of tangent PB.

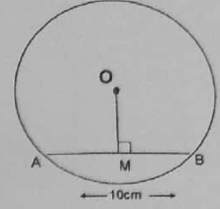
Solution: We know that the length of tangents drawn from an external point to a circle are equal.

$\therefore$ If PA = 5cm

then PB = 5cm



Q.3 In given figure, length of the chord AB is 10 cm and O is centre of the circle. $OM \perp AB$ then find AM .



Solution: $AB = 10cm$

$OM \perp AB$

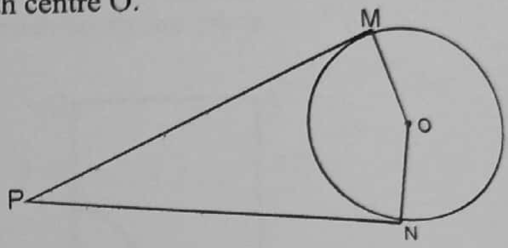
We know that perpendicular from the centre of a circle to the chord, bisect the chord.

$\therefore AM = \frac{1}{2}AB = \frac{1}{2}\times 10 = 5cm$

Q.4 In figure, PM and PN are the tangents to the circle with centre O.

(i) Find $\angle OMP$, $\angle ONP$

(ii) Are $PM = PN$?



Solution: (i) We know that the tangent of the circle is pependicular to the radius through the point of contact.

$\therefore \angle OMP = \angle ONP = 90^0$

(ii)Tangent drawn from an external point to a circle are equal.

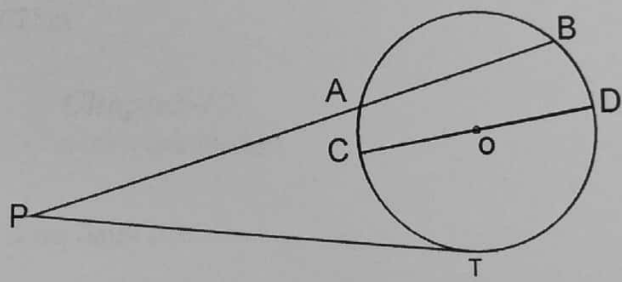
$\therefore PM = PN$

Q.5 Write from the figure:

(i) Name of the secant

(ii) Diameter

(iii) Longest chord



Solution:

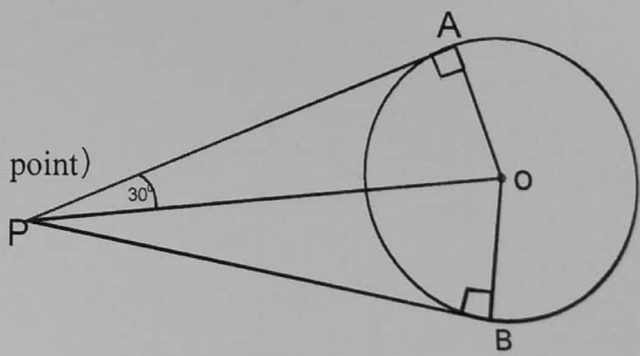
(i) Secant PAB

(ii) Diameter CD

(iii) Longest chord CD

(4 marks question)

Q.6 From figure, find $\angle BPO$.



Solution: In ΔPAO and ΔPBO

$\angle OAP = \angle OBP$ (each 90°)

$PA = PB$ (tangent from the external point)

$PO = PO$ (common)

By RHS of congurency

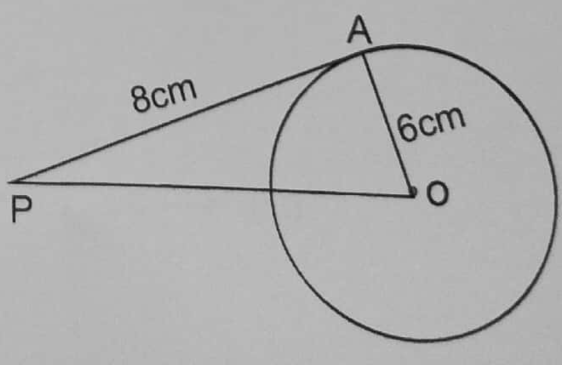
$\Delta PAO \cong \Delta PBO$

$\therefore \angle APO = \angle BPO$ (c.p.c.t)

But $\angle APO = 30^0$ (given)

$\therefore \angle BPO = 30^0$

Q.7 From figure, find OP .



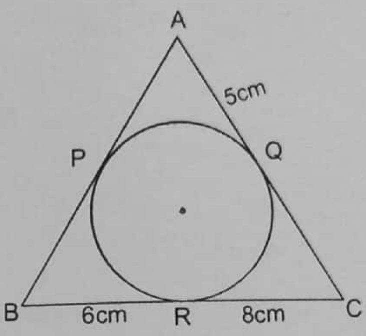
Solution: PA is the tangent, OA is the radius and

$\angle PAO = 90^0$

$\therefore$ In right angled ΔPAO

$OP^2 = AP^2 + OA^2$
$OP^2 = (8)^2 + (6)^2$
$OP^2 = 64 + 36 = 100$
$OP^2 = 10^2$ or $OP = 10cm$

Q.8 From figure, find the length of AB and AC



Solution: $AP = AQ = 5cm$ (tangents drawn from the external point)

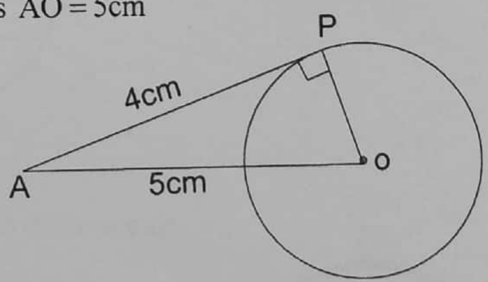
$BP = BR = 6cm$ (tangents drawn from the external point)

$CR = CQ = 8cm$ (tangents drawn from the external point)

$\therefore$ side $AB = AP + BP = 5 + 6 = 11cm$
side $AC = AQ + QC = 5 + 8 = 13cm$

Q.9 The length of a tangent from a point A at distance 5cm from the centre of the circle is 4cm. Find the radius of the circle.

Solution: A circle with centre O with radius OP. Tangent $AP = 4cm$
Distance of point A from centre O is $AO = 5cm$



$\angle APO = 90^0$
In right angled ΔAPO

$OA^2 = AP^2 + OP^2$

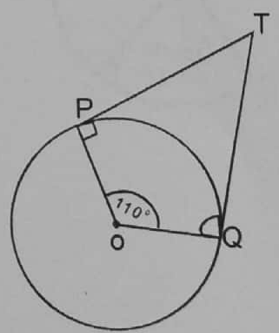
$(5)^2 = (4)^2 + OP^2$

$25 = 16 + OP^2$

or $OP^2 = 25 - 16 = 9 = 3^2$

$\therefore OP = 3cm$

Q.10 In figure, if TP, TQ are two tangent in a circle with centre O so that $\angle POQ = 110^0$ then find $\angle PTQ$.



Solution: In quadrilatrel $OQTP$

$\angle PTQ + \angle OPT + \angle OQT + \angle POQ = 360^0$

(sum of four angles of the quadrilatrel)

$\angle PTQ + 90^0 + 90^0 + 110^0 = 360^0$

$\angle PTQ + 290^0 = 360^0$

$\therefore \angle PTQ = 360^0 - 290^0 = 70^0$

Chapter-11

(3 marks question)

Q.1 Find the circumference of the circle whose radius is 7cm.

Solution: Radius of the circle $= 7$ cm
Circumference of the circle $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{ cm}$$

Q.2 Find the area of a circle whose diameter is 14 cm.

Solution: Diameter of the circle = 14 cm

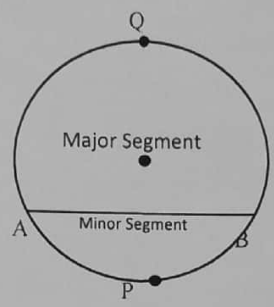
$$\therefore \text{ Radius } = \frac{14}{2} = 7 \text{ cm}$$

$$\text{Area of the circle } = \pi r^2 = \frac{22 \times 7 \times 7}{7} = 154 \text{ cm}^2$$

Q.3 Write the names of any four circular objects.

Solution: Cycle wheels, washer, bangles, paped, dart board

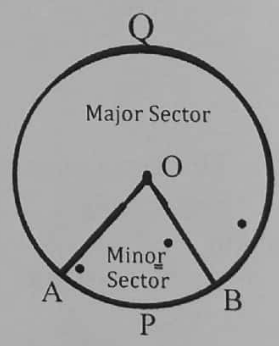
Q.4 From figure, write the name of major segment and minor segment.



Solution: Major Segment: AQ

Major Segment: APB

Q.5 In figure,write the name of minor sector and major sector.



Solution: Major sector : OAQB

Minor sector : OAPB

Q.6 Find radius of the circle whose circumference is 22cm.

Solution: Circumference of the circle = 22 cm

$$\therefore \quad 2\pi r = 22$$

$$2 \times \frac{22}{7} \times r = 22$$

$$\therefore r = \frac{22 \times 7}{2 \times 22} = \frac{7}{2} \text{ cm } = 3.5 \text{ cm}$$

(4 marks Question)

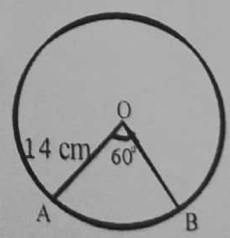
Q.7 In a circle of radius 14cm, an are subtends an angle 60^0 at the centre. Find the length of the arc.

Solution: Radius of the circle = 14 cm

Central angle $\theta = 60^0$

$$\text{length of arc } = 2\pi r \frac{\theta}{360}$$

$$= 2 \times \frac{22}{7} \times 14 \times \frac{60}{360} = \frac{44}{3} \text{cm}$$



Q.8 In a circle of radius 21cm, an arc subtends an angle 60^0 at the centre. Find the area of the sector formed by the arc.

Solution: Radius of the circle $= 21\text{cm}$

Central angle $\theta = 60^0$

Area of the sector $= \pi r^2 \dfrac{\theta}{360}$

$$= \frac{22}{7} \times 21 \times 21 \times \frac{60}{360}$$

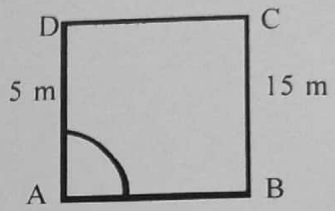
$$= 231\text{cm}^2$$

Q.9 A horse is tied to a peg at one corner of a square shaped grass field of side 15m by means of a 5m long rope. Find the area of that part of the field in which horse can graze.

Solution: Side of the square $= 15$ m

Length of the rope $= 5$ m

Each angle of square $= 90^0$



Area of that part of the field in which horse can graze $= \pi r^2 \dfrac{\theta}{360}$

$$= 3.14 \times 5 \times 5 \times \frac{90}{360} = \frac{39.25}{2}$$

$$= 19.625\text{m}^2$$

Chapter-12

(3 marks question)

Q.1 Give three examples of cuboid from daily life.

Solution: (i) Match box (ii) chalk box (iii) book

Q.2 The diameter of a sphere is 4cm then find its radius.

Solution: radius $= \dfrac{Diameter}{2}$

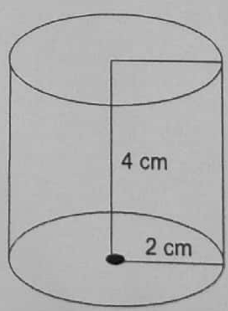
$$= \frac{4}{2}$$

$$= 2 \text{ cm}$$

Q.3 Fill in the blanks from figure:

(i) r = ________

(ii) h = ________



Solution: (i) r = 2cm

(ii) h = 4cm

Q.4 Match the following:

(a) Match box — (i) Sphere

(b) cap of a Joker — (ii) Cuboid

(c) Footbal — (iii) Cube

(d) Dice — (iv) Cone

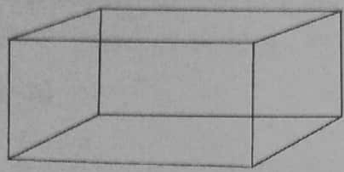
Solution: (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

Q.5 What is the relation between slant height of a cone, its radius and height.

Solution: slant height $= \ell$
radius $= r$
height $= h$

$$\ell^2 = h^2 + r^2 \Rightarrow \ell = \sqrt{h^2 + r^2}$$

Q.6 Draw a diagram of a cubiod. Count its faces and edges.



Solution: faces $= 6$
edges $= 12$

(4 marks Question)

Q.7 A cube has an edge of 4cm. Find its total surface area.

Solution: Side of a cube $= a = 4\text{cm}$

$\therefore$ Total surface area of a cube $= 6a^2$

$= 6 \times 4 \times 4 = 96\text{cm}^2$

Q.8 A cylinder whose diameter is 14cm and height is 10cm. Find its volume.

Solution: Diameter of the cylinder $= 14\text{cm}$

radius $r = \frac{14}{2} = 7\text{cm}$

height $h = 10\text{cm}$

$\therefore$ Volume $= \pi r^2 h$

$\frac{22}{7} \times 7 \times 7 \times 10$

$= 1540\text{cm}^3$

Q.9 Find the volume of a cone whose height is 21cm and radius of its base is 6cm.

Solution: Height of the cone $= 21\text{cm}$

Radius of the base of cone $r = 6\text{cm}$

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 21$

$= 792\text{cm}^3$

Q.10 The radius of a hemisphere is 14cm. Find its curved surface area.

Solution: Radius of the hemisphere $(r) = 14$ cm

Curved surface of the hemisphere $= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 14 \times 14$

$= 1232 \text{ cm}^2$

Q.11 Volume of a cube is $64cm^3$ Find its each side.

Solution: Volume $= (side)^3$

$(side)^3 = 64cm^3$

$(side)^3 = (4)^3$

side = 4cm

Q.12 Find the volume of a cuboid whose dimension are $5cm \times 10cm \times 4cm$

Solution: volume of cuboid $= \ell \times b \times h$

$= 5 \times 10 \times 4$

$= 200cm^3$

Q.13 How much milk can be poured in the hemispherical bowl whose radius is 7cm

Solution: radius of a hemi-spherical bowl =7cm

volume of a hemi-spherical $= \frac{2}{3}\pi r^3$

$= \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$

$= \frac{2156}{3} cm^3$

$= 718.67cm^3$

Chapter-13

(3 marks question)

Q.1 Write the upper and lower limit of a class internal 100−150.

Upper limit = 150

Lower limit =100

Q.2 Write the class mark of the class internal 10−30.

Solution:

$$\text{Class mark} = \frac{\textit{upper class limit}+\textit{lower class limit}}{2}$$

$$= \frac{10+30}{2}$$

$$= \frac{40}{2} = 20$$

Q.3 Find the mean of the data 2,9,7,8 and14.

Solution: $$\text{Mean} = \frac{\textit{sum of the observations}}{\textit{Number of observations}}$$

$$= \frac{2+9+7+8+14}{5}$$

$$= \frac{40}{5} = 8$$

Q.4 Find the mean of the first five natural numbers.

Solution: First five natural numbers $= 1, 2, 3, 4, 5$

$$\text{Mean} = \frac{1+2+3+4+5}{5}$$

$$= \frac{15}{5} = 3$$

Q.5 Write names of two methods to find mean.

Solution: (i) Direct method
(ii) Assumed mean method

Q.6 What is the class size of the class interval 60-100 ?

Solution: Class size = upper class limit - lower class limit

=100-60=40

Q.7 Median $= l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$, what is the meaning of l and f.

Solution: $l =$ lower limit of median class.
$f =$ frequency of median class

Q.8 Find the median of the data 6,7,9,5,4,8,7,3,2

Solution: Ascending order of given data = 2,3,4,5,6,7,7,8,9

Number of observation =9 and 9 is a odd number.

$\therefore$ Median $= \left(\frac{n+1}{2}\right)^{th}$ observation

$= \frac{9+1}{2} = \frac{10}{2} = 5^{th}$ observation

Median $= 5^{th}$ observation means 6

(4 marks question)

Q.9 Following given data represents the number of plants in 20 houses. Find the mean number of plants per house.

Number of plants	0-2	2-4	4-6	6-8	8-10	10-12	12-14
Number of houses	1	2	1	5	6	2	3

Solution:

Number of Plants	Number of houses f_i	Class mark x_i	$f_i x_i$
0-2	1	1	1
2-4	2	3	6
4-6	1	5	5
6-8	5	7	35
8-10	6	9	54
10-12	2	11	22
12-14	3	13	39
	$\sum fi = 20$		$\sum f_i x_i = 162$

From above data

Mean $\bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i}$

$= \frac{162}{20} = 8.1$

Q.10 The marks obtained by 20 students of class X of a certain school in Science paper consisting of 100 marks are presented in table below. Find the mean marks.

Marks obtained x_i	10	20	36	40	50
Number of students f_i	4	3	5	6	2

Soluation:

Marks obtained x_i	Number of students f_i	$f_i x_i$
10	4	40
20	3	60
36	5	180
40	6	240
50	2	100
	$\sum f_i = 20$	$\Sigma f_i x_i = 620$

Mean $\bar{x}$ $\frac{\Sigma f_i x_i}{\Sigma f_i}$

$= \frac{620}{20}$

$= 31$

Q.11 Marks obtained by 80 students of a class is given below. Find the mode of the data.

Marks obtained	0–10	10–20	20–30	30–40	40–50
No. of students	6	10	12	32	20

Soluation: In given data maximum number of students (frequency) are 32 and they lies in the class interval 30–40.

$\therefore$ Model class = 30–40

$\therefore = \ell = 30;\ f_1 = 32\ ;\ f_0 = 12\ ; f_2 = 20\ ; h = 10$

Mode $= \ell + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

$= 30 + (\frac{32 - 12}{2(32) - 12 - 20}) \times 10$

$= 30 + (\frac{20}{64 - 32}) \times 10$

$= 30 + \frac{200}{32}$

$= 30 + 6.25 = 36.25$

Chapter-14

(3 marks question)

Q.1 Write formula of probability

$$P(E) = \frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ outcomes}$$

Q.2 A box contains 5 red and 3 green marbles. If a marbles is drawn at random from the box. Write is the probability of getting of red marble.

Soluation: Let E be the probability of red marbles.

Number of possible outcomes $= 5+3=8$

$$P(E) = \frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ outcomes}$$

$$= \frac{5}{8}$$

Q.3 What is the probability of getting a head when a coin is tossed once.

Soluation: Total outcomes $= 2$

$$P\,(head) = \frac{1}{2}$$

Q.4 If $P(E)=0.05$ What is the probability of 'not E' ?

Soluation: $P(E)+P(\overline{E})=1$

$$P(\overline{E})=1-P(E)$$

$$=1-0.05=0.95$$

Q.5 A dice is thrown once, what is the probability of getting a number greater than 4 .

Soluation: Total outcomes $=6$

Outcomes greater than4 $= 2$

$$P\,(a\ number\ greater\ than\ 4) = \frac{2}{6} = \frac{1}{3}$$

(4 marks question)

Q.6 A bag contains 8 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is red?

Soluation: Total outcomes $=8+5=13$

number of red balls $=8$

$$P\ (red\ ball = \frac{8}{13}$$

Q.7 A box contains 3 blue, 2 white and 4 red marbles. If a marbles is drawn at random from the box, what is the probability that it will be white marble.

Soluation: Total outcomes $= 3+2+4=9$

Number of white marbles $= 2$

$$P\text{ (white marble) } = \frac{2}{9}$$

Q.8 A dice is thrown once. Find the probability of getting a number lying between 2 and 6 .

Soluation: Total outcomes of dice $= 6$

Numbers between 2 and 6 $= (3,4,5) = 3$

$$P(\text{Numbers between 2 and 6}) = \frac{3}{6} = \frac{1}{2}$$

Q.9 A dice is thrown once. Find the probability of getting an odd number.

Soluation: Total outcomes of dice $= 6$

odd number $= (1,3,5) = 3$

$$P\text{ (odd number) } = \frac{3}{6} = \frac{1}{2}$$

Q.10 Write the total outcomes when a dice is thrown once.

Soluation: Total possible outcomes $= 1,2,3,4,5,6 = 6$

Q.11 A child has a die whose six faces show the letters as given below:

A	B	C	E	D	E

The die is thrown once. What is the probability of getting E

Soluation: Total outcomes $= 6$

Number of E $= 2$

$$P(E) = \frac{2}{6} = \frac{1}{3}$$

Q.12 When we tossed a coin, the probability of head is greater than tail, less than tail or equal?

Soluation: When we tossed a coin, the probability to get head and tail are equal.