CBSE XTH EXAMINATION-2019
SUBJECT : MATHEMATICS

CODE NO. 30/2/1 **CLASS : X**

HINTS & SOLUTIONS

Section - A

1. HCF (336, 54) = 6.
LCM × HCF = 336 × 54
LCM = $\frac{336 \times 54}{6}$ = 3024

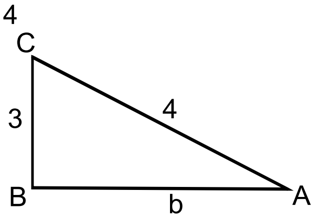
2. $2x^2 - 4x + 3 = 0$
$D = b^2 - 4ac$
= 16 – 4(2) (3)
= 16 – 24
= – 8 $\Delta < 0$
Roots are not real or imaginery roots.

3. Given AP $\frac{1}{a}, \frac{3-a}{3a}, \frac{3-2a}{3a}$ where $a \neq 0$
$d = a_2 - a_1$
$= \frac{3-a}{3a} - \frac{1}{a}$
$= \frac{3-a-3}{3a}$
$= \frac{-a}{3a} = \frac{-1}{3}$.

4. $\text{Sin}^2 60 + 2\tan 45^\circ - \cos^2 30^\circ$
Now we know sin60 = $\frac{\sqrt{3}}{2}$
$\therefore$ $\text{Sin}^2 60 = \frac{3}{4}$
tan45 = 1
cos30º = $\frac{\sqrt{3}}{2}$.
Substifating the value
$\frac{3}{4} + 2(1) - \frac{3}{4} = 2$

OR

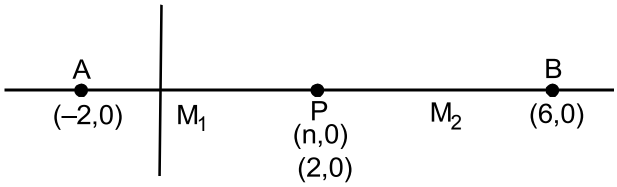
SinA = $\frac{3}{4}$



$$\text{CosA} = \sqrt{1-\sin^2 A} - \sqrt{1-\frac{9}{16}} = \frac{\sqrt{7}}{4}.$$

$$\text{SecA} = \frac{4}{\sqrt{7}}$$

5. $M_1 = M_2$



AP = PB

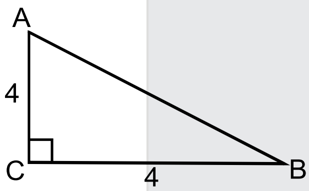
$\sqrt{[x-(-2)]^2} = \sqrt{(6-x)^2}$

x + 2 = 6 – x

2x = 4

x = 2

6.



Isosceles triangle right angled at C.

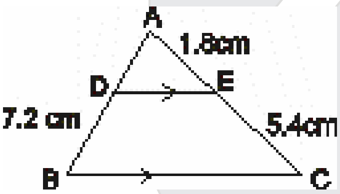
AC = BC

Now $AB^2 = (AC)^2 + (BC)^2$

$AB^2 = (4)^2 + (4)^2 = 32$

$AB = \sqrt{32} = 4\sqrt{2}$

OR



DE || BC

Using BPT $\dfrac{AD}{DB} = \dfrac{AE}{EC}$

$$\frac{AD}{7.2} = \frac{1.8}{5.4}$$

$$AD = \frac{1.8 \times 7.2}{5.4} = 2.4 \text{ cm}$$

Section - B

7. LCM of 306 & 657

306 = 2 × 3 × 3 × 17

657 = 3 × 3 × 73

∴ HCF = 3 × 3 = 9.

HCF × LCM = 306 × 657

$$\text{LCM} = \frac{306 \times 657}{9} = 22338$$

8. Given A (x, 4), B (–4, 6), C (–2, 3) Collinear

Area of triangle = 0

$\frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$

$\frac{1}{2}$ [x (6 – 3) + (– 4) [3 – 4] – (–2) [y – 6]] = 0

x (3) + 4 + 12 – 2y = 0

3x – 2y + 16 = 0

3x – 2y = 16

OR

Let A (1, – 1)

B (– 4, 6)

C (–3, – 5)

Area of triangle

$= \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$

$\frac{1}{2}\left|\left[1(6-(-5)) + (-4)(-5-(-1)) + (-3)(-1-6)\right]\right|$

$\frac{1}{2}[11 + 16 + 21]$

$\frac{1}{2}[48]$

24 sq units

9. Type of marble , Blue, black, green

P (Blue) = $\frac{1}{5}$

P (Black) = $\frac{1}{4}$

Let total marbles = x

P (green) = 1 = [P (Blue) + P(Black)]

$= 1 - \left[\frac{1}{5} + \frac{1}{4}\right] = 1 - \left[\frac{4+5}{20}\right] = 1 - \frac{9}{20} = \frac{11}{20}$

P(green) = $\frac{11}{20}$

Now green marbles = 11

Hence tofao no. of marbles = 20

10. Given eq x + 2y = 5 & 3x + ky + 15 = 0

x + 2y – 5 = 0

For unique solution

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

$\frac{1}{3} \neq \frac{2}{k}$

Hence k $\neq$ 6

Any real value except 6

11. Let the larger supplementary angle be x

$\therefore$ other angle = 180 – x

A/c to problem

x = 180 – x + 18º

2x = 198

X = 99º

$\therefore$ 99, 81

OR

Let present age of sumit = 3x

$\therefore$ Present age of his son = x

Five years later sumit = 3x + 5

Five years later Son = x + 5

A/c to problem

$3x + 5 = 2\frac{1}{2}[x + 5]$

$3x + 5 = \frac{5}{2}[x + 5]$

6x + 10 = 5x + 25

x = 15

Son's age = 15 years

Sumit' age = 45 years

12. Given

CI	frequency
25-30	25
30-35	34 f_0
35-40	50 f_1
40-45	42 f_2
45-50	38
50-55	14

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

Modal class = 35 – 40

ℓ = lower limit of modal class = 35

h = class size = 35 – 30 = 5

$f_1 = 50$

$f_0 = 34$

$f_2 = 42$

mode = $35 + \frac{50 - 34}{100 - 34 - 42} \times 5$

$= 35 + \frac{16}{100 - 76} \times 5 = 35 + \frac{80}{24} = \frac{920}{24} = 38.34$

Section - C

13. Given $\sqrt{3}$ in an irrational number

We need to prove $2 + 5\sqrt{3}$ is also an irrational number

Let $2 + 5\sqrt{3}$ be a rational no in form of $\frac{p}{q}$

$\therefore \quad 2 + 5\sqrt{3} = \frac{p}{q}$

$2 - \frac{p}{q} = 5\sqrt{3}$

Rational $\leftarrow \frac{2q-p}{5q} = \sqrt{3} \rightarrow$ Irrational

Now $\frac{2q-p}{5q}$ is an rational number

But $\sqrt{3}$ is irrational

Since rational $\neq$ Irrational

This is a contradiction

$\therefore$ Our assumptions is incorrect

Hence $2 + 5\sqrt{3}$ is irrational

OR

Given numbers 2048 and 960

Divide the larger number by smaller one

2048 = 960(2) + 128

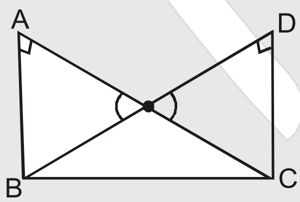
960 = 128(7) + 64

128 = 2(64) + 0

Now remainder is zero

$\therefore$ 64 is HCF

14. **Given** : two right triangles ABC and DBC are on the same hypotenuse BC



To Prove : AP × PC = BP × PD

Proof : In ΔABC & ΔDCP

$\angle A = \angle D$ {each 90º}

$\angle APB = \angle DPC$ {vertically opp $\angle A$}

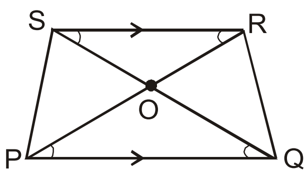
By A-A similarity

ΔABP ~ ΔDCP

$\frac{BP}{CP} = \frac{AP}{DP}$ {Corresponding sides of similar Δ are proportional }

AP × PC = BP × PD

OR



In trapezium PQ || RS & PQ = 3RS

Now in ΔPOQ & ΔROS

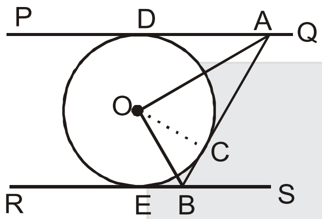
$\angle OPQ = \angle ORS$ {Let int $\angle$s}

	$\angle OQP$ =	$\angle OSR$
Using	A – A criterion	
$\therefore$	$\Delta POQ \sim \Delta ROS$	

Now $\therefore \dfrac{ar\ \ POQ}{ar\ \ ROS} = \left(\dfrac{PQ}{RS}\right)^2$

$= \left(\dfrac{3RS}{RS}\right)^2 = \dfrac{9}{1}$

15.



Given : In C(O, r) PQ || RS are two parallel tangents.
AB is also tangent.

To Prove : $\angle AOB = 90^\circ$

Construction : Join OD, OE & OC

Proof : In ΔAOD & ΔAOC

OD = OC {equal radius}

OA = OA {Common}

AD = AC {Tangent from ext point is equal }

$\therefore$ $\Delta AOD \cong \Delta AOC$ {By SSS congruency }

$\therefore$ $\angle AOD = \angle AOC$ {y Cpct} …. (i)

Similarly In ΔBOC & ΔBOE

OC = OE

OB = OB

BC = BE

$\therefore$ By SSS

$\Delta BOC \cong \Delta BOE$

$\therefore \angle BOC = \angle BOE$ By cpct … (ii)

Now $\angle DOE = 180^\circ$ (angle on a straight line)

$\therefore$ $\angle AOD + \angle AOC + \angle BOE + \angle BOC = 180^\circ$

From eq^n (i) & (ii)

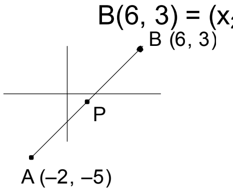
$2\angle AOC + 2\angle BOC = 180^\circ$

$2(\angle AOC + \angle BOC) = 180^\circ$

$\angle AOB = 90^\circ$

16. Let $A(-2, -5) = (x_1, y_1)$

$B(6, 3) = (x_2, y_2)$



Let the ratio

Be $\lambda : 1$

Coordinate of P = $\left[\dfrac{\lambda(6)+1(-2)}{\lambda+1}, \dfrac{\lambda(3)+1(-5)}{\lambda+1}\right]$

$$P = \left[\frac{6\lambda - 2}{\lambda + 1}, \frac{3\lambda - 5}{\lambda + 1}\right]$$

Now P lies on line

$x - 3y = 0$

$$\frac{6\lambda - 2}{\lambda + 1} - 3\left(\frac{3\lambda - 5}{\lambda + 1}\right) = 0$$

$$\frac{6\lambda - 2}{\lambda + 1} - \left(\frac{9\lambda - 15}{\lambda + 1}\right) = 0$$

$$\frac{6\lambda - 2 - 9\lambda + 15}{\lambda + 1} = 0$$

$13 - 3\lambda = 0$

$13 = 3\lambda$

$$\frac{\lambda}{1} = \frac{13}{3}$$

Line segment is divided in ratio 13 : 3.

$\therefore$ Point of intersection

$$x = \frac{6\lambda - 2}{\lambda + 1} = \frac{6\left(\frac{13}{3}\right) - 2}{\left(\frac{13}{3}\right) + 1}$$

$$= \frac{\frac{24}{1}}{\frac{16}{3}} = \frac{72}{16} = \frac{9}{2}$$

$$Y = \frac{3\lambda - 5}{\lambda + 1} = \frac{3\left(\frac{13}{3}\right) - 5}{\frac{13}{3} + 1} = \frac{8}{\frac{16}{3}} = \frac{24}{16} = \frac{3}{2}$$

$$\text{Point} = \left(\frac{9}{2}, \frac{3}{2}\right)$$

17. Solve

$$\left(\frac{3\sin 43^\circ}{\cos 47^\circ}\right)^2 - \frac{\cos 37^\circ \operatorname{cosec} 53^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$$

$$\left(\frac{3\cos 47^\circ}{\cos 47^\circ}\right)^2 - \frac{\cos 37^\circ . \frac{1}{\sin 53^\circ}}{\tan 5^\circ . \tan 25^\circ (1) \cot 25^\circ . \cot 5^\circ}$$

$$9 - \frac{\cos 37^\circ . \frac{1}{\cos 37^\circ}}{1} = 9 - 1 \qquad = 8$$

18. Given Square OABC is inscribed in quadrant OPBQ.

OA = 15

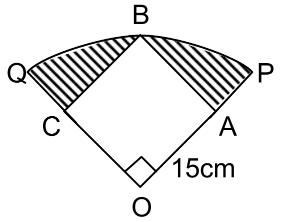


Figure - 4

To find area of shaded region.

Area of shaded region = Area of quadrant – Area of square

$= \frac{1}{4}(\pi r^2) - (OA)^2$

Now radius of quadrant = Length of diagonal

Now OB = $\sqrt{(OA)^2 + (AB)^2}$

r = OB = $\sqrt{(15)^2 + (15)^2} = 15\sqrt{2}$ cm

$\therefore$ Area of shaded region

$= \frac{1}{4}(3.14)\left(15\sqrt{2}\right)^2 - (15)^2$

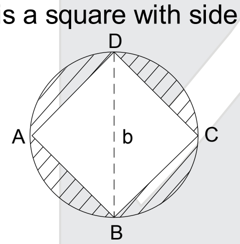
$= \frac{3.14 \times 225 \times 2}{4} - 225$ cm^2

= 128.25 cm^2

OR

Given

ABCD is a square with side $2\sqrt{2}$ cm.



To find Area of shaded region

Diameter of circle = Length of diagonal of square

Now BD = $\sqrt{\left(2\sqrt{2}\right)^2 + \left(2\sqrt{2}\right)^2}$

BD = 4 cm

Radius OB = 2 cm

Required Area = Area of circle – Area of square

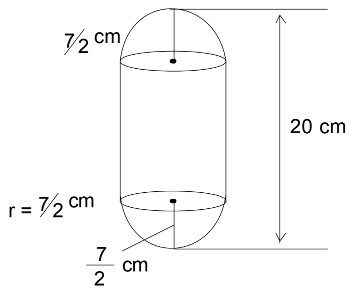
$= \pi r^2 - a^2$

$= 3.14 \times (2)^2 - \left(2\sqrt{2}\right)^2$

= 12.56 – 8

= 4.56 cm^2

19.



Total height = 20 cm

$\therefore$ Height of cylinder = $20 - \frac{7}{2} - \frac{7}{2}$

= 13 cm.

And radius at ends = $\frac{7}{2}$ cm.

$\therefore$ Total volume of solid = Vol of cylinder + 2 × Vol of hemisphere

$= \pi r^2 h + 2 \times \frac{2}{3}\pi r^3$

$= \left(\frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times 13\right) + \left(2\times\frac{2}{3}\times\frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times\frac{7}{2}\right)$

= 500.5 + 179.67 cm^3

= 680.17 cm^3.

20. Using step deviation method

C1 Mass	u_i	f_i	$d_i = u_i - a$ = u_i –47.5	$u_i = \frac{d_i}{a}$	$f_i u_i$
30–35	32.5	14	–15	–3	–42
35–40	37.5	16	–10	–2	–32
40–45	42.5	28	–5	–1	–28
45–50	47.5 = a	23	0	0	0
50–55	52.5	18	5	1	18
55-60	57.5	8	10	2	16
60–65	62.5	3	15	3	9
		$\sum f_i = 110$			$\sum f_i u_i = -59$

Let assnmed mean a = 47.5

Mean = $a + \frac{\sum f_i u_i}{\sum f_i} \times h$

$= 47.5 + \frac{(-59)}{110}\times 5$

= 47.5 – 2.68

= 44.82

21. Given Polynomial

$F(x) = 3x^4 - 9x^3 + x^2 + 15x + k$

$g(x) = 3x^2 - 5$

Completely divisible

$\therefore$ remainder = O

$$
\begin{array}{r|l}
 & x^2 - 3x + 2 \\
3x^2 - 5 & 3x^4 - 9x^3 + x^2 + 15x + k \\
 & 3x^4 \qquad - 9x^2 \\
 & - \qquad\quad + \\
\hline
 & -9x^3 - 6x^2 + 15x + k \\
 & -9x^3 \qquad + 15x \\
 & + \qquad\quad - \\
\hline
 & 6x^2 \qquad + k \\
 & 6x^2 \qquad - 10 \\
\hline
 & k + 10 = 0 \\
 & k = -10
\end{array}
$$

OR

Given $P(x) = 7y^2 - \frac{11}{3}y - \frac{2}{3}$

$= \frac{1}{3}(21y^2 - 11y - 2)$

$= \frac{1}{3}(21y^2 - 14y + 3y - 2)$

$= \frac{1}{3}(7y(3y - 2) + (3y - 2))$

$\frac{1}{3}(7y + 1)(3y - 2)$

to find zero we equate P(x) = 0

Zeroes of polynomial $\Rightarrow \frac{2}{3}$ & $\frac{-1}{7}$

Now sum of zeroes = $-\frac{b}{a}$

$\frac{2}{3} + \left(-\frac{1}{7}\right) = -\left(\frac{-11}{3\times 7}\right) = \frac{11}{21}$

$\frac{14-3}{21} = \frac{11}{21} = \frac{11}{21}$

Product of zeroes = $\frac{c}{a}$

$\left(\frac{2}{3}\right)\left(\frac{-1}{7}\right) = \frac{\frac{-2}{3}}{7}$

$\frac{-2}{21} = \frac{-2}{21}$

Hence verified

22. $x^2 + px + 16 = 0$

For equal roots D = 0

$b^2 - 4ac = 0$

$P^2 - 4(16)(1) = 0$

$P^2 = 64$

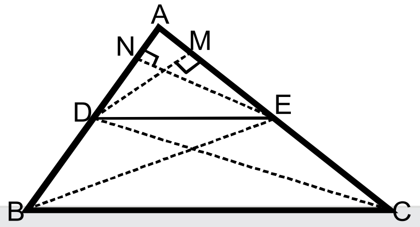
$P = \pm 8$

Now if p = 8	if p = –8
$x^2 + 8x + 16 = 0$	$x^2 - 8x + 16 = 0$
$(x + 4)^2 = 0$	$(x - 4)^2 = 0$
x = –4	x = 4

Section - D

23. **Given :** A ΔABC in which a line parallel to side BC intersects other two sides AB and AC at D and E respectively.

To Prove : $\frac{AD}{DB} = \frac{AE}{EC}$.



Construction : Join BE and CD and draw DM ⊥ AC and EN ⊥ AB.

Proof : Area of Δ ADE $= \frac{1}{2}$ (base × height) $= \frac{1}{2}$ AD × EN.

Area of Δ ADE is denoted as ar(ADE).

So, ar(ADE) $= \frac{1}{2}$ AD × EN and ar(BDE) $= \frac{1}{2}$ DB × EN.

Therefore, $\frac{ar(ADE)}{ar(BDE)} = \frac{\frac{1}{2} AD \times EN}{\frac{1}{2} DB \times EN} = \frac{AD}{DB}$ ... (i)

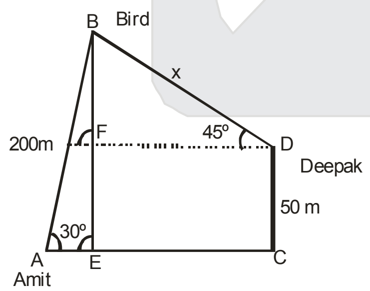
Similarly, ar(ADE) $= \frac{1}{2}$ AE × DM and ar(DEC) $= \frac{1}{2}$ EC × DM.

And $\frac{ar(ADE)}{ar(DEC)} = \frac{\frac{1}{2} AE \times DM}{\frac{1}{2} EC \times DM} = \frac{AE}{EC}$ ... (ii)

Note that Δ BDE and Δ DEC are on the same base DE and between the two parallel lines BC and DE.
So, ar(BDE) = ar(DEC) ... (iii)
Therefore, from (i), (ii) and (iii), we have :

$\frac{AD}{DB} = \frac{AE}{EC}$ **Hence Proved.**

24.



ΔACB

$\sin 30° = \frac{BE}{AB}$

$\frac{1}{2} = \frac{BE}{200}$

BE = 100 M

Now BE = BF + FE [∵ FE = DC = 50 m]

100 = BE + 50

BF = 50 m

In $\triangle BFD \Rightarrow \sin 45° = \frac{BF}{BD}$

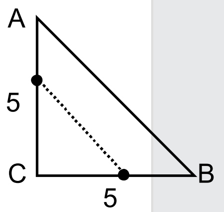
$\frac{1}{\sqrt{2}} = \frac{50}{x}$

BD = x = $50\sqrt{2}$ m

Distance of bird from Deepak is $50\sqrt{2}$ m

25. h_1= height of cylinder = 220 cm
r_1=12cm
$v_1 = \pi r_1^2 h_1$
$v_1 = \pi(144)(220)$
$= 31680\,\pi\ cm^3$
Now h_2 = height of another cylinder = 60 cm
r_2 = radius of another cylinder = 8 cm
$v_2 = \pi(r_2)^2 h_2$
$= \pi(64)(60)$
$= 3840\,\pi\ cm^3$
Total vol of pole = $31680\,\pi + 3840\,\pi$
$= 111532.8\ cm^3$
Required weight = 111532.8 × 8gm = 892.26 kg

26. Construct

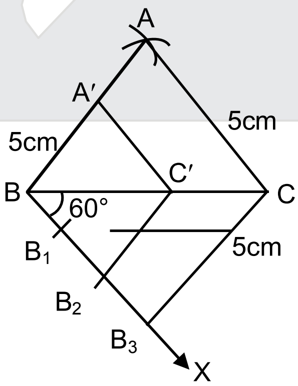


Steps of construction

(i) Draw BC = 5 cm.

(ii) Taking B and C as centre and radius equal to 5 cm draw arc and join AB and AC, thus equilateral $\triangle ABC$ is formed.

(iii) With B as centre, draw a ray BX making an acute angle CBX with BC.



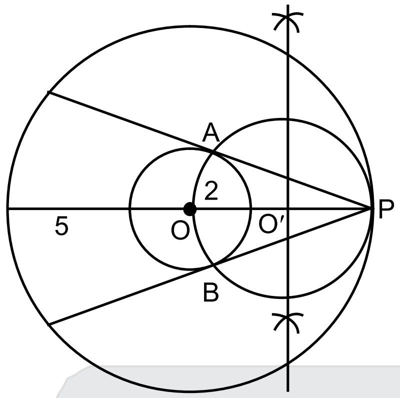
(iv) Along BX, mark off three points B_1, B_2, B_2 such that $BB_1 = B_1B_2 = B_2B_2$

(v) Join B_3C.

(vi) Draw $B_2C' \parallel B_3C$, meeting BC at C′.

(vii) From C′ draw $C'A' \parallel CA$, metting BA at A′. thus BC′A′ is required triangle, each of whose sides is $\frac{2}{3}$ of corresponding sides of $\triangle ABC$.

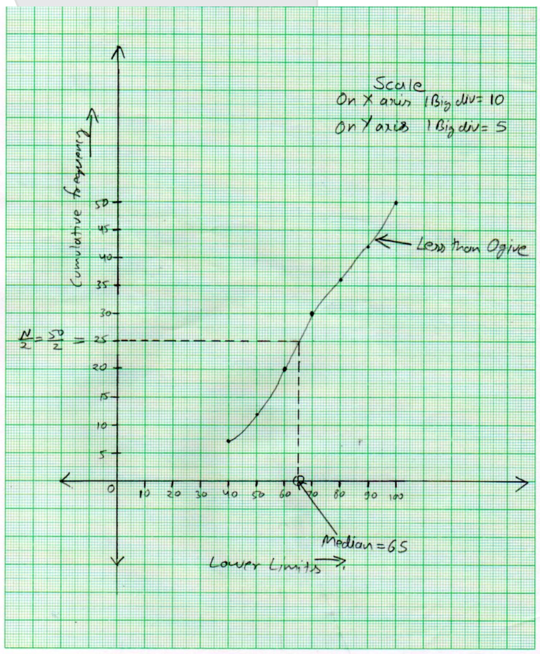
OR



(i) Draw a circle of radius 2 cm with centre O.
(ii) Draw another circle of radius 5 cm with same centre O.
(iii) Take a point P on second circle and join OP.
(iv) Draw ⊥ bisector of OP which intersect OP at O′.
(v) Taking O′ as centre and OO′ as radius, draw a circle to intersect the first circle in two points say A and B.
(vi) Join PA and PB these are required triangle from P.

27.

CI	Frequency	Cumulative freuqency (less than type)
30 – 40	7	7
40 – 50	5	12
50 – 60	8	20
60 – 70	10	30
70 – 80	6	36
80 – 90	6	42
90 – 100	8	50 = N



28. $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta \operatorname{cosec}\theta$

$$\frac{\frac{\sin\theta}{\cos\theta}}{1-\frac{\cos\theta}{\cos\theta}} + \frac{\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}$$

$$\frac{\sin\theta}{\cos\theta} \times \frac{\sin\theta}{\sin\theta-\cos\theta} + \frac{\cos\theta}{\sin\theta} \times \frac{\cos\theta}{\cos\theta-\sin\theta}$$

$$\frac{\sin^2\theta}{\cos\theta(\sin\theta-\cos\theta)} + \frac{\cos^2\theta}{\cos\theta(\sin\theta-\cos\theta)}$$

$$\frac{\sin^3\theta \quad - \quad \cos^3\theta}{\sin\theta\ \cos\theta\ (\sin\theta-\cos\theta)}$$

$$\frac{(\sin\theta-\cos\theta)\ (\sin^2\theta+\cos^2\theta+\sin\theta\cos\theta)}{(\sin\theta\ \cos\theta)\ (\sin\theta-\cos\theta)}$$

$$\frac{1+\sin\theta\ \cos\theta}{\sin\theta\ \cos\theta}$$

$1 + \sec\theta \quad \text{cosec}\theta$

OR

$$\frac{\sin\theta}{\cot\theta+\text{cosec}\theta} = 2 + \frac{\sin\theta}{\cot\theta-\text{cosec}\theta}$$

LHS $\dfrac{\sin\theta}{\dfrac{\cos\theta}{\sin\theta}+\dfrac{1}{\sin\theta}} \Rightarrow \dfrac{\sin^2\theta}{1+\cos\theta} \times \dfrac{1-\cos\theta}{1-\cos\theta}$

$\Rightarrow \dfrac{\sin^2\theta(1-\cos\theta)}{1-\cos^2\theta}$

$\Rightarrow \dfrac{\sin^2\theta(1-\cos\theta)}{\sin^2\theta}$

$\Rightarrow 1-\cos\theta$

RHS $2 + \dfrac{\sin\theta}{\cot\theta-\text{cosec}\,\theta}$

$\Rightarrow 2 + \dfrac{\sin\theta}{\dfrac{\cos\theta}{\sin\theta}-\dfrac{1}{\sin\theta}} \Rightarrow 2 + \dfrac{\sin^2\theta}{\cos\theta-1} \Rightarrow 2 - \dfrac{\sin^2\theta}{\cos\theta-1} \times \dfrac{\cos\theta+1}{\cos\theta+1}$

$\Rightarrow 2-(1+\cos\theta)$

$\Rightarrow 1-\cos\theta$

LHS = RHS

29. Let – 82 be the a_n term

$a = -7$, $d = -12-(-7) = -12+7 = -5$

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

$-82 = (-7) + (n-1)(-5)$

$\dfrac{75}{5} = n-1$

$15 = n-1$

$n = 16$, so – 82 is the 16^{th} term.

Let – 100 be the a_m term

$a_m = a + (m-1)d$

$-100 = (-7) + (m-1)(-5)$

$\dfrac{93}{5} = m-1$

$m = \dfrac{93}{5}+1 = \dfrac{98}{5}$

as m is not a natural number so – 100 will not be the term of the A.P.

OR

a = 45
d = 39 – 45 = – 6

Let $S_n = 180 = \frac{n}{2}(2a + (n-1)d)$

$180 = \frac{n}{2}[90 + (n-1)(-6)]$

$180 = n[45 + (n-1)(-3)]$

$60 = n[15 + (n-1)(-1)]$

$60 = 15n - n^2 + n$

$n^2 - 16n + 60 = 0$

$(n-10)(n-6) = 0$

n = 10 or 6

Reason for double answer in that the given AP in decreaing AP and after some terms the terms are became negative.

30. Let the marks in Hindi and English are x, y respectively.

$x + y = 30 \Rightarrow y = 30 - x.$

ATQ

$(x + 2)(y - 3) = 210$

$(x + 2)(30 - x - 3) = 210$

$(x + 2)(27 - x) = 210$

$-x^2 + 25x + 54 = 210$

$x^2 - 25x + 156 = 0$

$(x - 12)(x - 13) = 0$

x = 12 or 13.

If x = 12 then y = 30 – x = 30 – 12 = 18

If x = 13 then y = 30 – x = 30 – 13 = 17

So marks in Hindi and English is 12 and 18 or 13 and 17.