NBSE

NATIONAL BOARD OF SCHOOL EXAMINATION

Q.No.	01	02	03	04	05	06	07	08	09	10	TOTAL
MARKS	01	01	01	01	01	01	01	01	01	01	10

Q.No.	11	12	13	14	15	16	17	18	19	20	TOTAL
MARKS	01	01	01	01	01	01	01	01	01	01	10

Q.No.	21	22	23	24	25	26	27	28	29	30	TOTAL
MARKS	02	02	02	02	02	02	03	03	03	03	24

Q.No.	31	32	33	34	35	36	37	38	39	40	TOTAL
MARKS	03	03	03	03	04	04	04	04	04	04	36

Examiner must fill above boxes with question-wise marks obtained by student.

GRAND TOTAL	80
MARKS IN WORDS	Eighty

Certified that I have evaluated this answer book according to the correct set of question paper and strictly as per the NBSE marking scheme. I also certify that no question has been left un-assessed inside the answer book.

Signature of the Examiner

Certified that marks against each question in the table above have been correctly filled up in accordance with the evaluation done inside the answer book. The marks have also been transferred in the award list/web/app correctly against the roll number of the candidate.

Signature of the Co-ordinator

(To be filled by the student)

Note: Roll No. provided by NBSE to be filled here.

Roll No.	1	0	9	0	0	0	7

Student should write code no. as written on the top of the question paper in the box provided →

No. of supplementary answer-book(s) used (if any)

NBSE

Section A

Q1

$12576 = 4052 \times 3 + 420$

$4052 = 420 \times 9 + 272$

$420 = 272 \times 1 + 148$

$272 = 148 \times 1 + 124$

$148 = 124 \times 1 + 24$

$124 = 24 \times 5 + 4$

1

$24 = 4 \times 6 + 0$

We find that remainder is zero

Thus, last non zero remainder $= 4$ Ans

$\therefore$ HCF$(4052, 12576) = \underline{\underline{4}}$

Solution 2. Total number outcomes $= 52$

1

There are 26 red cards, 13 of hearts and 13 of diamonds

The probability of getting a red ace card $= \frac{1}{26}$ Ans

Sol3:- $x^2 - 0x - 3 = 0$

$a = 1$

$b = 0$

$c = \cdot 3$

Sum of zeroes $= -\frac{b}{a} = \frac{0}{1} = 0$ Ans

1

Sol4: Empirical relation

Mode = 3 Median − 2 Mean.

1

Sol5: $\frac{23}{2^2 3^2 7^3}$

1

Sol6: Let A $(1,7)$, $B = (4,2)$

$x_1 = 1 \quad y_1 = 7$

$x_2 = 4 \quad y_2 = 2$

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

$= \sqrt{(4-1)^2 + (2-7)^2}$

$= \sqrt{(3)^2 + (-5)^2}$

$\Rightarrow \sqrt{9 + 25}$

$= \sqrt{34}$ Ans

1

Sol 7: Let (x, y) be the coordinate of the Point
$A = (4, -3)$
$B = (8, 5)$ in the Ratio $3:1$ then,

A P B
$(4,-3)$ (x, y) $(8,5)$

$$x = \frac{m_1 x_2 + m_2 \cdot x_1}{m_1 + m_2} = \frac{3 \times 8 + 1 \times 4}{4} = \frac{24+4}{4} = \frac{\cancel{28}}{\cancel{4}} 7$$

$$y = \frac{m_1 y_2 + m_2 \cdot y_1}{m_1 + m_2} = \frac{3 \times 5 + 1 \times (-3)}{4} = \frac{15 - 3}{4} = \frac{\cancel{12}}{\cancel{4}} 3$$ 1

$\therefore$ The Coordinate of P are $(7, 3)$

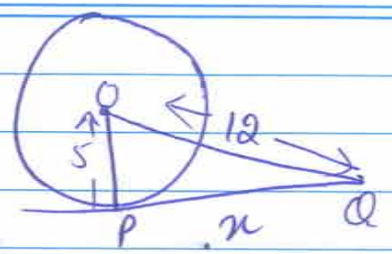
Sol 8: $\operatorname{Cosec} \theta = \sec (90 - \theta)^\circ$. 1

Sol 9: $y = p(x)$

3 Ans 1

Sol 10 PTO

Sol 10



PQ is a tanget drawn on the circle from Q

Given

$OP = 5\,cm$

$OQ = 12\,cm$

$OP \perp PQ$ (Radius $\perp$ tangent at the point of contact)

$(OQ)^2 = (OP)^2 + PQ^2$ 1

$(12)^2 = (5)^2 + PQ^2$

$144 - 25 = PQ^2$

$\sqrt{119} = PQ$

$PQ = \sqrt{119}$ Ans

Sol 11. The common point of a tanget to a circle and the circle is called Point of Contact 1

Sol 12: If the ratio of sides of two similar triangle is 4:9 then the ratio of their Area $4\times4 : 9\times9$ 2

$\boxed{16:81}$

or

All Equilateral triangles are similar.

Sol 13 Common difference of AP $\frac{7}{2}, 3, \frac{5}{2}, 2$ is $-\frac{1}{2}$

1

$\frac{3}{1} - \frac{7}{2} = \frac{6-7}{2} = -\frac{1}{2}$

$\frac{5}{2} - \frac{3}{1} = \frac{5-6}{2} = -\frac{1}{2}$ $-\frac{1}{2}$ Ans

Sol 14 Value of $\cos^2 17' - \sin^2 73'$ is -

$\cos^2 (90-73') - \sin^2 73'$

1

$\cancel{\sin^2 73'} - \cancel{\sin^2 73'} = 0$ Ans

Sol 15 Value of $\tan 90'$ is Not Defined

1

Sol 16 Total outcomes 1, 2, 3, 4, 5, 6 = 6

1

Probability of getting an odd No. = 3

$P(\text{odd no.}) = \frac{\text{No. of favourable outcome}}{\text{Total no. of outcome}} = \frac{3}{6} = \frac{1}{2}$ Ans

Sol17- Area of quadrant $= \frac{\theta}{360} \times \pi r^2$

Circumference $= 44$

$2 \times \frac{22}{7} \times r = 44$

$r = \frac{\cancel{44}^{2} \times 7}{\cancel{2} \times \cancel{22}}$ $= \boxed{r = 7}$

$\frac{1}{\cancel{4}_{2}} \frac{\cancel{90}}{\cancel{360}} \times \frac{\cancel{22}^{11}}{\cancel{7}} \times \cancel{7} \times 7$

$= \frac{77}{2}\ cm^2$ Ans

1

Sol. 18.

$a = -5$

$d = -3$

$a_1 = a = -5$ —(i)

$a_2 = a_1 + d \Rightarrow -5 + (-3)$

$= -5 - 3 = -8$ —(ii)

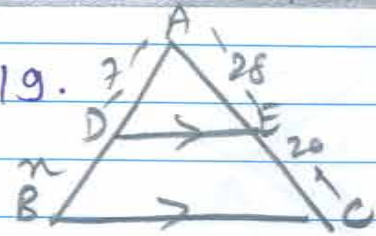
$a_3 = a_2 + d \Rightarrow -8 + (-3) = -8 - 3 = -11$ —(iii)

$a_4 = a_3 + d \Rightarrow -11 + (-3) = -11 - 3 = -14$ —(iv)

$-5, -8, -11, -14$ Ans

1

Sol 19.



$$\frac{AD}{BD} = \frac{AE}{EC}$$ (by B.P.T theorem)

$$\frac{7}{x} \times \frac{28}{20}$$

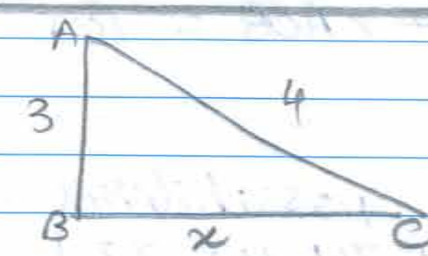
$$140 = 28x$$

$$\frac{140}{28} = x$$

$$\boxed{x = 5}$$ Ans

1

Sol 20. If $\sin A = \frac{3}{4}$ $\frac{P}{H}$



$$AC^2 = AB^2 + BC^2$$

$$(4)^2 = (3)^2 + BC^2$$

$$16 - 9 = BC^2$$

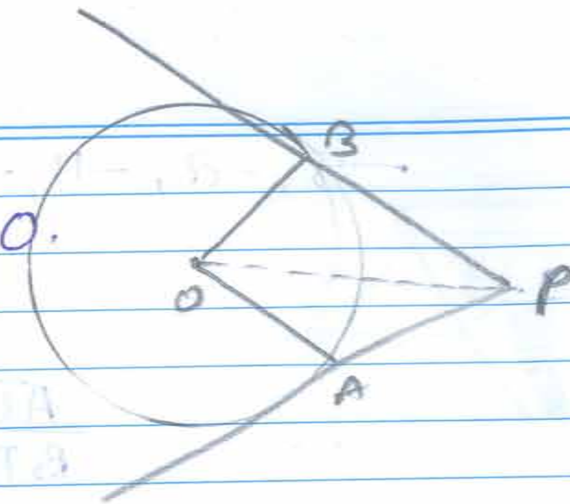
$$\sqrt{7} = BC$$

$$\boxed{BC = \sqrt{7}}$$

$$\cos A = \frac{\sqrt{7}}{4} = \frac{B}{H}$$

$$\tan A = \frac{3}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$$ Ans

1



Sol 21: Given PA and PB are two tangets from an external point P to a circle with centre O. A and B are the point of contact of these tangetts.

To Prove $\angle APB + \angle AOB = 180°$

Proof - $OA \perp AP$
$OB \perp BP$

2

$\angle OAP = 90°$, $\angle OBP = 90°$

In Quadrilateral OAPB

$\angle OAP + \angle APB + \angle OBP + \angle AOB = 360°$

$90° + \angle APB + 90° + \angle AOB = 360°$

$\angle APB + \angle AOB = 180°$ as required

Sol 22 Total possibilities = 4
(HH, TH, HT, TT)
Possibilities where head comes once = 3
Probability $= \frac{3}{4}$ Ans

2

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Sol 23. Let $r_1 = 19$ cm
$r_2 = 9$ cm.

$= 2\pi(r_1 + r_2)$
$= 2 \times \frac{22}{7}(19+9)$
$= 2 \times \frac{22}{\cancel{7}}(\cancel{28}^{4}) = 2 \times \frac{22}{7} \times R$
$= 176 = 2 \times \frac{22}{7} \times R$

$R = \frac{\cancel{176} \times 7}{2 \times \cancel{22}}$
$R = 28$ cm. Ans

2

Sol 24 $\cos^2 30° + \sin^2 45° - \frac{1}{3}\tan^2 60° + \cos 90°$

$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 - \frac{1}{3}(\sqrt{3})^2 + 0$

$= \frac{3}{4} + \frac{1}{2} - \frac{1}{\cancel{3}} \times \cancel{3} + 0$

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

2

Or

$\tan 2A = \cot (A - 18)$

$\cot (90 - 2A) = \cot (A - 18)$

$90 - 2A = A - 18$
$90 + 18 = A + 2A$
$108 = 3A$
$36 \; \cancel{\frac{108}{3}} = A$

Sol 25
(a) Sum of zeroes -1
product of zeroes $= -2$

1

$x^2 - Sx + p \Rightarrow x^2 - (-1) + (-2)$
$\Rightarrow x^2 + 1x - 2$ Ans

(b)

$x + 2 \;)\; 2x^2 + 3x + 1 \;($
$\cancel{2x^2} + 4x$
$- \quad -$
$-\cancel{x} + 1$
$-\cancel{x} - 2$
$+ \quad +$
3

1

$Q = 2x - 1$
$R = 3$

NBSE

Sol 26. probability of green marble $= \frac{2}{3}$

$P(E) + (\bar{E}) = 1$

$\therefore$ Probability of Blue marble $= 1 - \frac{2}{3} = \frac{1}{3}$ Ans

2

Sol 27. $\sin\theta(1+\tan\theta) + \cos\theta(1+\cot\theta) = \sec\theta + \operatorname{cosec}\theta$

LHS

$= \sin\theta(1+\tan\theta) + \cos\theta(1+\cot\theta)$

$= \sin\theta\left(1+\frac{\sin\theta}{\cos\theta}\right) + \cos\theta\left(1+\frac{\cos\theta}{\sin\theta}\right)$

$= \sin\theta\left(\frac{\cos\theta+\sin\theta}{\cos\theta}\right) + \cos\theta\left(\frac{\sin\theta+\cos\theta}{\sin\theta}\right)$

$= (\sin\theta+\cos\theta)\ \frac{\sin^2\theta+\cos^2\theta}{\cos\theta\cdot\sin\theta} \Rightarrow (\sin\theta+\cos\theta) \frac{1}{\cos\theta\cdot\sin\theta}$

$= \frac{\cancel{\sin\theta}}{\cancel{\sin\theta}\cdot\cos\theta} + \frac{\cancel{\cos}}{\sin\theta\cdot\cancel{\cos\theta}}$

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

3

$= \sin\theta + \cos\theta = RHS$ proved

14

Or

$\sin\theta(1+\tan\theta)+\cos\theta(1+\cot\theta) = \sec\theta+\operatorname{cosec}\theta$

L.H.S

$\sin\theta(1+\tan\theta)+\cos\theta(1+\cot\theta)$

$\sin\theta\left(1+\frac{\sin\theta}{\cos\theta}\right)+\cos\theta\left(1+\frac{\cos\theta}{\sin\theta}\right)$

$\sin\theta\left(\frac{\cos\theta+\sin\theta}{\cos\theta}\right)+\cos\theta\left(\frac{\sin\theta+\cos\theta}{\sin\theta}\right)$

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

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

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

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

$= \frac{\cancel{\sin\theta}}{\cos\theta\cdot\cancel{\sin\theta}}+\frac{\cancel{\cos\theta}}{\cancel{\cos\theta}\cdot\sin\theta}$

$= \frac{1}{\cos\theta}+\frac{1}{\sin\theta} \Rightarrow \sec\theta+\operatorname{cosec}\theta$ RHS Proved.

Sol 28 We have $x^2 - 2x - 8 = 0$

$x^2 - 4x + 2x - 8 = 0$

$x(x-4) + 2(x-4) = 0$

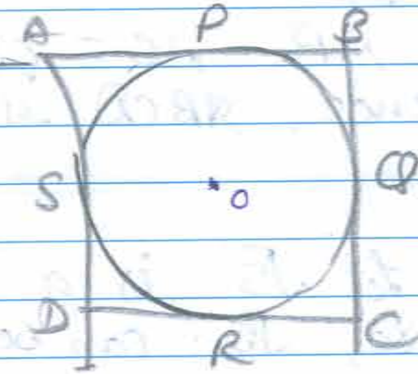
$(x+2)(x-4) = 0$

$x = -2, x = 4$

Sum of zeroes $= -\frac{b}{a} = -\frac{2}{1} = -2$

Product of zeroes $= \frac{c}{a} = \frac{8}{1} = 8$ Ans

3



Sol 29 Give ABCD is a llgm with centre O.

$\therefore$ $AB = CD$ and $AB \parallel CD$

$AD = BC$ and $AD \parallel BC$

P, Q, R, S are ~~touching~~ point of both the circle

$\therefore$ $AP = AS$ (tangent from point A) —— (i)

$BP = BQ$ (Tanget from point B) —— (ii)

$CR = CQ$ tanget from point C —— (iii)

$DR = DS$ Tanget from point D —— (iv)

adding (1) (2) (3) and (4) we get

$(AP + BP) + (CR + DR) = AS + BQ + CQ + DS$

$\Rightarrow AB + CD = AD + BC$

$AB + AB = \cancel{AD}\, BC + BC$ ABCD is a llgm

$2AB = 2BC$

$AB = BC$ 3

$\therefore AB = BC = CD = AD$

Hence, ABCD is a rhombus.

Sol 30

Let $\sqrt{5}$ is a rational number

So, $\sqrt{5}$ can be written in the form $\frac{a}{b}$

$\therefore \sqrt{5} = \frac{a}{b}$

$5 = \frac{a^2}{b^2}$ (squaring both sides)

$\Rightarrow \frac{a^2}{5} = b^2$ —— (i)

5 Divides a^2

$\Rightarrow$ 5 divides a as well - (ii)

Let $\frac{a}{5} \neq \frac{c}{1}$

So, $a = 5c$

$\frac{25c^2}{5} = b^2$ from eq.(i)

$\Rightarrow 5c^2 = b^2$

Hence 5 divides b^2

Also, 5 divides b ----(iii)

from eq. (ii) and eq.(iii) we get

5 divides both a and b

$\therefore$ a and b are not co prime

Hence, our assumption is wrong.

$\therefore \sqrt{5}$ is an irrational number.

3

Or

Prime factor of 404 = $2 \times 2 \times 101$

and prime factor of 96 = $2 \times 2 \times 2 \times 2 \times 2 \times 3$

HCF of 404 and 96 = 4

LCM of 404 and 96 = 9696

Now, HCF × LCM = Product of two numbers

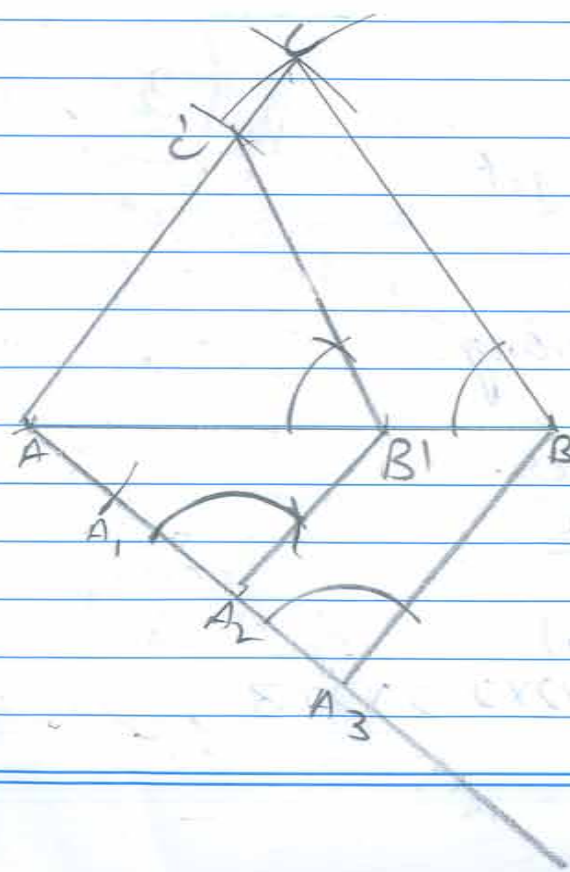
$4 \times 9696 = 404 \times 96$

$38784 = 38784$

LHS = RHS

Hence, verified.

Sol 31.



Steps of construction -

(a) Draw $AB = 7$ cm

(b) with B as centre and radius 6 cm, draw an arc.

(c) With A as centre and radius 5cm, draw an arc to meet the previous arc at c.

(d) Join BC and AC, we get $\triangle ABC$ with the given data.

(e) Draw any ray AX making an acute angle with AB on the side opposite to vertex C.

3

(f) Locate 3 points A_1, A_2 and A_3 and AX.

(g) Join A_3B

Draw a line parallel A_3B to interest AB at B'.

(h) draw a line parallel to BC to meet AC at C'.

$AB'C'$ is the required triangle.

Sol 32

In $\triangle ABC$, $\angle CAB = 90'$

$BC^2 = AB^2 + AC^2 = (14)^2 + (14)^2 = 14\sqrt{2}$ cm.

Required Area = Area of Semicircle with BC as Diameter + Area of $\triangle ABC$ - area of quadrant of a circle of Radius 14 cm.

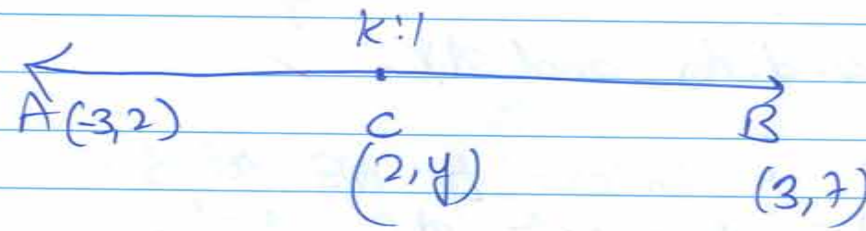
$$= \frac{1}{2} \times \frac{22}{7} \left[\frac{14\sqrt{2}}{2}\right]^2 + \frac{1}{2} \times 14 \times 14 - \frac{1}{4} \times \frac{22}{7} \times 14 \times 14 \Big] \text{cm}^2$$

$$= (154 + 98 - 154)\ \text{cm}^2$$

3

$$= 98\ \text{cm}^2.$$

Sol 33.



So, x - coordinate of point C is

$$\frac{3k-3}{k+1} = 2$$

$$\Rightarrow 3k - 3 = 2k + 2$$

$$k = 5$$

Now, y - coordinate of point C is

$$\frac{7k+2}{k+1} = y$$

$$\frac{35+2}{6} = y$$

3

$$y = \frac{35+2}{6}$$

$$y = \frac{37}{6}$$

Required ratio is 5:1 and y is $\frac{37}{6}$

Sol 34 $\frac{(x-2)}{x-4} + \frac{x-6}{x-8} = 6\frac{2}{3}$

3

$$\frac{(x-2)(x-8)+(x-6)(x-4)}{(x-4)(x-8)} = \frac{20}{3}$$

$$\Rightarrow \frac{x^2-10x+16+x^2+24-10x}{x^2-12x+32} = \frac{20}{3}$$

$$\Rightarrow \frac{2x^2-20x+40}{x^2-12x+32} = \frac{20}{3}$$

$$\frac{x^2-10x+20}{x^2-12x+32} = \frac{10}{3}$$

$$3x^2-30x+60-10x^2+120x-320=0$$

$$7x^2-90x+260=0$$

$$D = (-90)^2-4(7)(260)$$

$$= 8100-7280$$

$$= 820$$

$$x = \frac{90 \pm \sqrt{820}}{14}$$ Ans

35

Sol ~~34~~. Let the two numbers are x and y

According to the question

$$x-y = 5 \quad \text{——— (1)}$$

and $$\frac{1}{y}-\frac{1}{x} = \frac{1}{10}$$

$$\frac{x-y}{xy} = \frac{1}{10}$$

$\Rightarrow xy = 50$

$y(5+y) = 50$

$y^2 + 5y - 50 = 0$

$y^2 + 10y - 5y - 50 = 0$

$y(y+10) - 5(y+10) = 0$

$(y+10)(y-5) = 0$

4

$y+10 = 0$

$\boxed{y = -10}$

$y-5 = 0$

$\boxed{y = 5}$

$x = -5$, $\cancel{x} = 10$. Ans

Sol 36 Let first term = 156
common diff. d = -7

Sum of n-terms = 465

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

$465 = \frac{n}{2}[156+(n-1)(-7)]$

$465 = \frac{n}{2}(156-7n+7)$

~~96~~ $930 = 163n - 7n^2$

$7n^2 - 163n + 930 = 0$ using quadratic formula

$n = 10, \frac{186}{14}$

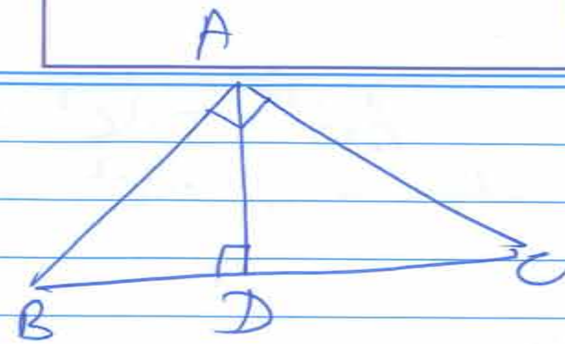
$n = 10$ Ans

4

Do not write your Roll Number on this Answer Book

Supplementary Answer-Book(s) No. ....

Fictitious Roll No. (To be entered by Board)



Sol 37.

To prove : $BC^2 = AB^2 + AC^2$

Const. from A, Draw $AD \perp BC$

Proof – $\triangle DBA$ and $\triangle ABC$

$\angle ABD = \angle ABC$ (Same angle)

and $\angle ADB = \angle BAC$ (each 90°)

$\therefore \triangle DBA \sim \triangle ABC$ (AA Similarity)

$\therefore \frac{AB}{BC} = \frac{BD}{AB} \Rightarrow AB^2 = BD \times BC$ — (1)

In $\triangle DAC$ and $\triangle ABC$

$\angle ACD = \angle ACB$ (Same Angle)

and $\angle ADC = \angle BAC$ (90°)

$\triangle DAB \sim \triangle ABC$

$\therefore \frac{AC}{BC} = \frac{DC}{AC} \Rightarrow AC^2 = DC \times BC$ — (2)

On adding (i) and (ii)

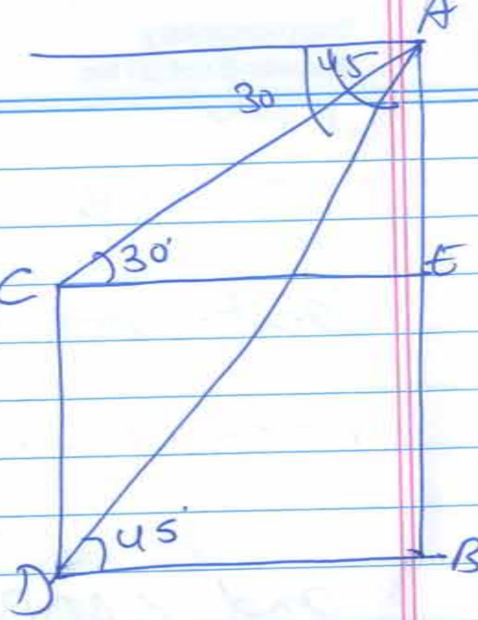
$AB^2 + AC^2 = BD \times BC + DC \times BC$

$= (BD + DC) \times BC = BC \times BC$

4

$AB^2 + AC^2 = BC^2$

Hence, $BC^2 = AB^2 + AC^2$ Proved.



Sol 38

AB is a building and CD is another Building CD = 8cm.

from C, Draw $CE \perp AB$

CDBE is a rectangle, so CE = DB and BE = CD = 8cm.

The angle of Depression a

$\angle ACE = 30^\circ$ and $\angle ADB = 45^\circ$

from right angled $\triangle ADB$

$\tan 45^\circ = \frac{AB}{BD} = 1$

$\frac{AB}{DB} = 1$

$AB = BD$

from right angled $\triangle ACE$

$\tan 30^\circ = \frac{AE}{CE} = \frac{1}{\sqrt{3}}$ $\frac{AB - BE}{DB}$ $= \frac{AB - 8}{DB}$

(+)

NBSE

3

$DB = \sqrt{3}(AB-8)$

$AB = \sqrt{3}\,AB - 8\sqrt{3}$

$(\sqrt{3}-1)\,AB = 8\sqrt{3}$

$AB = \dfrac{8\sqrt{3}}{\sqrt{3}-1} \times \dfrac{\sqrt{3}+1}{\sqrt{3}+1} = \dfrac{8\sqrt{3}(\sqrt{3}+1)}{2} = 4(3+\sqrt{3})$

from (i)

$DB = AB = 4(3+\sqrt{3})$

Hence, the height of multi storeyed Building $4(3+\sqrt{3})\,m$ and Distance between the two Building is also $4(3+\sqrt{3})$ m.

4

Sol 39 $R = 40$ cm

$r = 16$ cm

$h = 32$ cm

Volume of frustum $= \frac{1}{3}\pi r h(R^2 + r^2 + Rr)$

Required Capacity of conical bucket = Volume of frustum

$\frac{1}{3} \times \frac{22}{7} \times 32(16 \times 16) + 40 \times 40 + 16 \times 40$

$= \frac{1}{3} \times \frac{22}{7} \times 32 \times 256 + 1600 + 640$

$= \frac{1}{3} \times \frac{22}{7} \times 32 \times 2496$

$= \frac{585728}{7} = 83675.42\ cm^2$

$l = \sqrt{1024 + (40 - 16)}$

$= \sqrt{1024 + 14} = 40$ cm

$T.S.A = \pi l(R + r) + r\pi^2$

$= \pi(40)(40 + 16) + \pi(16)^2$

$= 7844.57\ cm^2$

Sol 40 C.I	f	cf
0-10	4	4
10-20	5	9
20-30	13	22
30-40	20	42
40-50	14	56
50-60	8	64
60-70	4	68

9

$n = \cancel{\frac{68}{2}}\ 34$

$$\text{Median} = l_1 + \frac{\frac{N}{2} - cf}{f} \times h$$

$$= 30 + \frac{34-22}{20} \times 10$$

$$= 30 + \frac{12}{20} \times 10$$

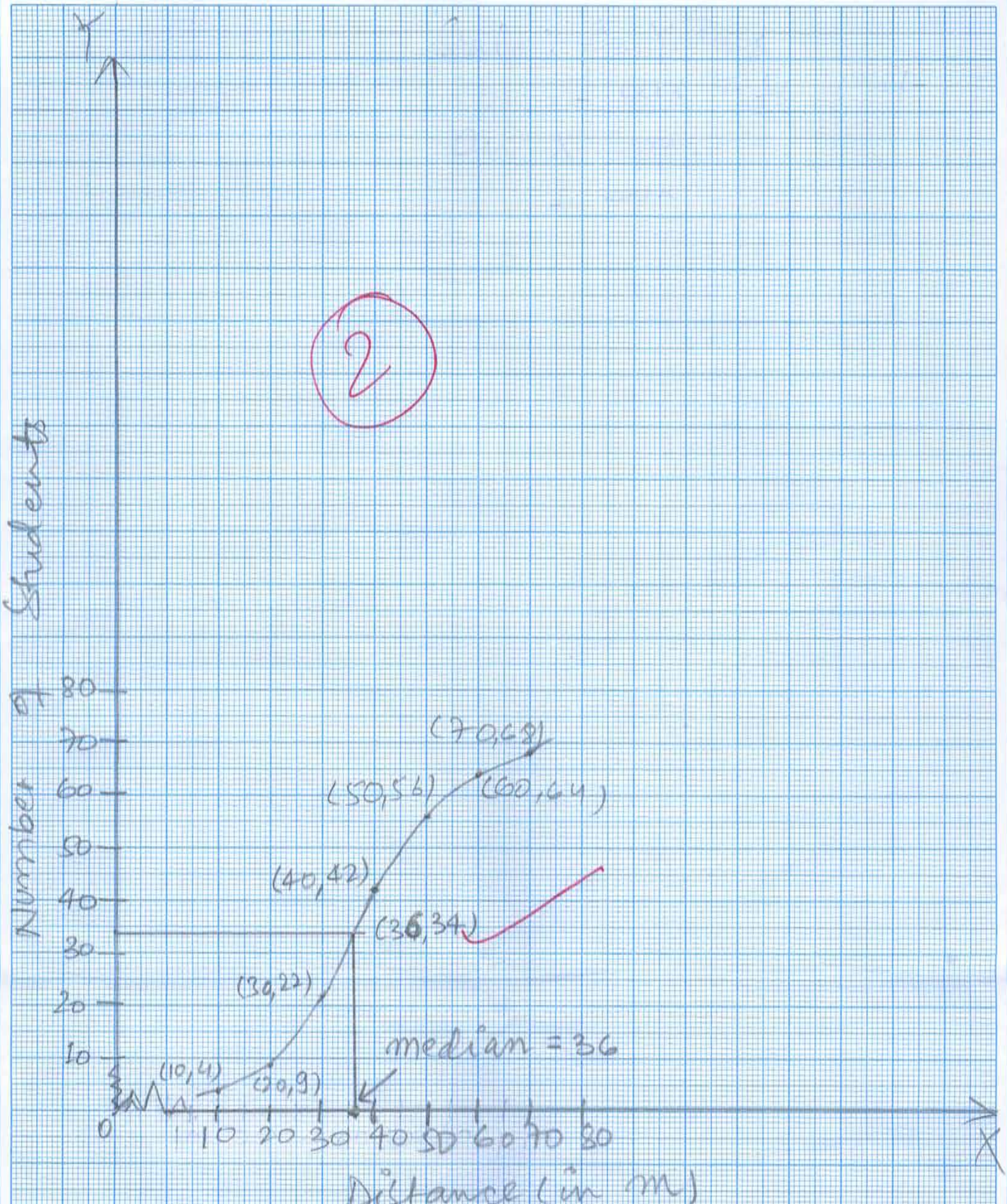
$$= 30 + 6$$

Median $= 36$

Distance.	f	cf
Less than 0		0
Less than 10	4	4
Less than 20	5	9
Less than 30	13	22
Less than 40	20	42
Less than 50	14	56
Less than 60	8	64
Less than 70	4	68

Roll No.

NBSE CLASS: 09 ☐ 10 ☐ SET: I ☐ II ☐ III ☐



Tie this graph paper properly with your Answer Sheet. Also write your roll number clearly.