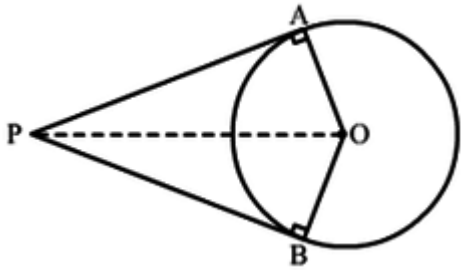
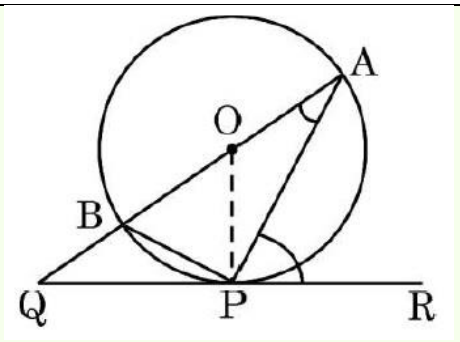
KENDRIYA VIDYALAYA SANGATHAN PATNA REGIION (SET-A)
Class X Session 2025-26

PRE – BOARD-2 EXAMINATION
MATHEMATICS

	SECTION - A	
1	(C) RATIONAL NUMBER	1
2	(D) -3/5	1
3	(C)2 DISTINCT REAL ROOTS	1
4	(B) 8 UNITS	1
5	(A) (0,-3)	1
6	(A) 3	1
7	(C) (2,5)	1
8	(D) 11 CM	1
9	(A) 62.5	1
10	(D) 2	1
11	(B) K = 1	1
12	(A) 60^0	1
13	(A) 10	1
14	(C) 11/36	1
15	(C) 96 SQ. CM	1
16	(A) 1/3	1
17	(D) $\frac{\tan\beta}{\sqrt{1+tan^2\beta}}$	1
18	(C)11 CM	1
19	(c)	1
20	(a)	1
	SECTION – B	
21	If any number ends with 0 then it must be divisible by 5 Hence its prime factorization must contain 5 But we know 4=2×2, Since 5 is not present in the prime factorization, So, there is no natural number n for which 4^n end with 0.	1 1
22	In ΔABC, ∠1 = ∠2 ∴ AB = BD ……(i) Given, AD/AE = AC/BD Using equation (i), we get AD/AE = AC/AB …….(ii) In ΔBAE and ΔCAD, by equation (ii), AC/AB = AD/AE , ∠A= ∠A (common) ∴ ΔBAE ~ ΔCAD [By SAS similarity criterion]	½ ½ ½ ½
23	Given sin(A+B)=1 ⇒sin(A+B)=sin90 ⇒A+B=90 ……(1) Again, cos(A−B)= $\sqrt{3}/2$ ⇒cos(A−B)=cos30 ⇒A−B=30 ……(2) ,by solving (1)&(2) ∴A=60^0 ;B=30^0 **OR** For finding the value of sec θ = $2/\sqrt{5}$ For putting and solving $16/5\sqrt{5}$	 ½ ½ 1 1 1
24	1 hour = 60 minutes ∠(1 minute) = 360°/60 => 6° ∴ The number of minutes between 7:05 and 7:40 = 35 minutes. => ∠(35 minutes) = 35 x 6° = 210°	 1

	=> Area = 210°/360° x π x 6^2 => 210°/360° x π x 36 => 210°/10° x π [∵ Cancelling 360° with 36] => 21° x π [∵ Cancelling 210° with 10°] => 21° x 22/7 [∵ π =22/7 (or) π = 3.14] => 3 x 22 => 66cm^2	1
	Or	
	Sum of the angles ∠A+∠B+∠C+∠D=360 Radius of arcs (r) = 7 cm Area= (θ/360)πr^2 = (360/360) * 7*7*22/7 = 154 sq.cm	½ ½ 1
25	Let AP and BP be the two tangents to the circle with centre O.  To Prove : AP = BP Proof : In ΔAOP and ΔBOP OA = OB (radii of the same circle) ∠OAP=∠OBP=90∘ (since tangent at any point of a circle is perpendicular to the radius through the point of contact) OP = OP (common) ∴ΔAOP≅ΔBOP (by R.H.S. congruence criterion) ∴ AP = BP (corresponding parts of congruent triangles)	½ ½ ½ ½
	SECTION – C	
26	let us assume that $\sqrt{7}$is rational. Then, there exist co-prime positive integers a and b such that √7=a/b ⟹b√7 = a (Squaring on both sides, we get) $a^2=7b^2$ Therefore, a^2 is divisible by 7 and hence, a is also divisible by 7 so, we can write a=7p, for some integer p. Substituting for a, we get $49p^2=7b^2 \Longrightarrow b^2=7p^2$. This means, b^2 is also divisible by 7 and so, b is also divisible by 7. Therefore, a and b have at least one common factor, i.e., 7. But, this contradicts the fact that a and b are co-prime. Thus, our supposition is wrong. Hence,√ 7 is irrational.	½ 1 ½ ½ ½
27		



OA = OP (radii of same circle) ½

$\Rightarrow \angle OAP = \angle OPA$ ...(1) ½

Since the tangents at any point of a circle is perpendicular to radius at the point of contact.

$\therefore \angle OPR = 90^o$ 1

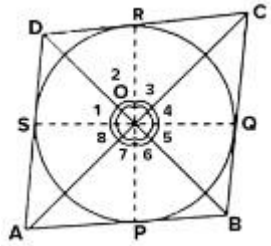
$\Rightarrow \angle OPA + \angle APR = 90^o$

$\Rightarrow \angle OAP + \angle APR = 90^o$ [From (1)]

$\Rightarrow \angle QAP + \angle APR = 90^o$ 1

Hence proved.

OR



Given ,AB,BC,CD and DA are tangents to circle with Centre forming quadrilateral ABCD. 1

To prove-$\angle AOB + \angle COD = 180°$

Cons-Draw diameters SQ & PR and join OS,OR,OQ& OP.

Proof-Tangents drawn from an external points are equal.

$$\angle 1 = \angle 2, \angle 3 = \angle 4, \angle 5 = \angle 6, \angle 7 = \angle 8$$

$$2(\angle 2 + \angle 3) + 2(\angle 7 + \angle 6) = 360° \text{ or, } (\angle 2 + \angle 3) + (\angle 7 + \angle 6) = 180°$$ 2

$$\angle AOB + \angle COD = 180°$$

28

L.H.S=$\frac{sin\theta}{1+cos\theta} + \frac{sin\theta}{1-cos\theta} =$

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

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

$=\frac{2\,sin\theta}{sin^2\theta}$ 1

$=\frac{2}{sin\theta}$

=R.H.S 1

	OR (B) L.H.S = sec A(1 – sin A)(sec A + tan A) Here, sec A = 1/cos A and tan A= sin A/cos A => 1/cos A×(1–sin A)×(1/ cos A + sin A/cos A) Take 1/cos A outside from the brackets, => 1/cos A×(1–sin A)×(1/cos A(1+sinA)) =>1/cos^2 A (1 – sin A) (1+sinA) =>1/cos^2 A (1–$sin^2 A$) => (1–sin^2 A)cos ^{2}A => 1/ cos ^{2}A –sin^2 A/cos^2 A => sec^2 A−tan^2 A=1=RHS	½ ½ ½ ½ ½ ½
29	Let us split the middle term to find the factors of the equation $x^2 + 7x + 10$ $x^2 + 7x + 10 = x^2 + 2x + 5x + 10$ Taking out the common terms, we get $x(x + 2) + 5 (x + 2)$ $(x + 2) (x + 5)$ Put both the factors equal to zero. $x + 2 = 0$ and $x + 5 = 0$ $x = - 2$ and $x = - 5$ The zeroes of the polynomial $x^2 + 7x + 10$ are - 2 and - 5. A quadratic polynomial in the form of $ax^2 + bx + c = 0$ where $a \neq 0$, the coefficients can be expressed as sum and product of the zeroes. The sum of the zeroes is expressed as - b/ a that is coefficient of x / coefficient of x^2 (- 2) + (- 5) = - 7 = - (- 7)/ 1 = - b/ a (∵ coefficient of x / coefficient of x^2) The product of the zeroes is expressed as c/ a that is constant term/ coefficient of x^2 - 2 × (- 5) = 10 = 10/ 1= c/ a (∵ constant term/ coefficient of x^2)	 1 1 1
30	Let the number of right answers and wrong answers be x and y respectively. According to the question, 3x - y = 40 ... (i) 4x - 2y = 50 ⇒ 2x - y = 25 ... (ii) Subtracting equation (ii) from equation (i), we get x = 15 ... (iii) Putting this value in equation (ii), we get 30 - y = 25 y = 5 Therefore, number of right answers is 15 and number of wrong answers is 5 Total number of questions is 20.	 ½ ½ 1 1
31	We first find the class mark x_i, of each class and then proceed as follows	1

Weight (in kg)	Number of Animals (f_i)	Class mark (x_i)	Deviations $d_i=x_i-a$	f_id_i
100-110	4	105	-20	-80
110-120	14	115	-10	-140
120-130	21	125=a	0	0
130-140	8	135	10	80
140-150	3	145	20	60
	$\sum f_i = 55$			**$\sum f_id_i=-80$**

1

∴ Assumed mean (a) = 125,
Class width (h) = 10 and total observation (N) = 50
By assumed mean method,

Mean $=a+\sum f_id_i/\sum f_i$

$=125+(-80)/50$ 1

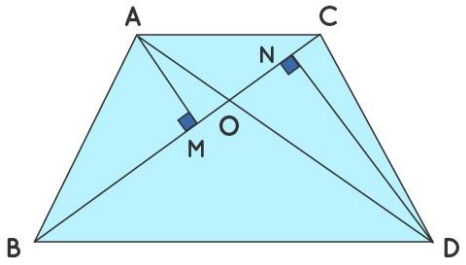
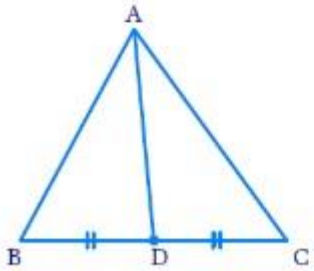
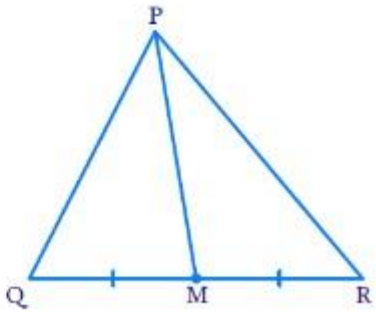
$=125-1.6=123.4$kg

SECTION – D

32 Let the time taken by the smaller pipe to fill the tank be x hr.
Time taken by the larger pipe = (x - 10) hr ½
Part of tank filled by smaller pipe in 1 hour = 1/x
Part of tank filled by larger pipe in 1 hour = 1/x−10 1
It is given that the tank can be filled in $9\frac{3}{8}\ hrs = \frac{75}{8}$ hours by both the pipes together.
Therefore,
$\frac{1}{x}+\frac{1}{x-10}=\frac{1}{75/8}$ 1
$\Rightarrow$ x−10+x / x(x−10)$=\frac{8}{75}$ 1
$\Rightarrow$ (2x−10)/(x−10)$=\frac{8}{75}$
$\Rightarrow 75(2x-10)=8x^2-80x$
$\Rightarrow 150x-750=8x^2-80x$
$\Rightarrow 8x^2-230x+750=0$
$\Rightarrow 8x^2-200x-30x+750=0$
$\Rightarrow 8x(x-25)-30(x-25)=0$ 1
$\Rightarrow (x-25)(8x-30)=0$
$\Rightarrow x=25,\ 30/8$
Time taken by the smaller pipe cannot be 30/8=3.75 hours. As in this case, the time taken by the larger pipe will be negative, which is logically not possible. ½
Therefore, time taken individually by the smaller pipe and the larger pipe will be 25 and 25 - 10 =15 hours respectively.

OR

Let the sides of the two squares be x m and y m. Therefore, their perimeter will be 4x and 4y respectively and their areas will be x^2 and y^2 respectively. It is given that 1
4x - 4y = 24
x - y = 6
x = y + 6
Also, $x^2+y^2=468$ 1
$\Rightarrow (6+y)^2+y^2=468$
$\Rightarrow 36+y^2+12y+y^2=468$
$\Rightarrow 2y^2+12y+432=0$ 1
$\Rightarrow y^2+6y-216=0$
$\Rightarrow y^2+18y-12y-216=0$
$\Rightarrow y(y+18)-12(y+18)=0$
$\Rightarrow (y+18)(y-12)=0$ 1
$\Rightarrow y=-18,\ 12$

	However, side of a square cannot be negative. Hence, the sides of the squares are 12 m and (12 + 6) m = 18 m	1
33	In ΔABC, draw AM ⊥ BC In ΔDBC, draw DN ⊥ BC  Now, In ΔAOM and ΔDON ∠AMO = ∠DNO = 90 ° ∠AOM = ∠DON (Vertically opposite angles) ⇒ ΔAOM ~ ΔDON (AA criterion) ⇒ AM / DN = OM / ON = AO / DO..... (1) Now, Area of ΔABC = 1/2 × base × height = 1/2 × BC × AM Area of ΔDBC = 1/2 × BC × DN Area of ΔABC / Area of ΔDBC = (1/2 × BC × AM) / (1/2 × BC × DN) Area of ΔABC / Area of ΔDBC = AM/DN Thus, Area of ΔABC / Area of ΔDBC = AO/DO OR   Diagram ,given ,to prove In ΔABC and ΔPQR AB/PQ = BC/QR = AD/PM [given] AD and PM are median of ΔABC and ΔPQR respectively ⇒ BD/QM = (BC/2)/(QR/2) = BC/QR Now, in ΔABD and ΔPQM AB/PQ = BD/QM = AD/PM ⇒ ΔABD ~ ΔPQM [SSS criterion] Now, in ΔABC and ΔPQR AB/PQ = BC/QR [given in the statement] ∠ABC = ∠PQR [∵ ΔABD ~ ΔPQM] ⇒ ΔABC ~ ΔPQR [SAS criteion]	1 1 1 1 1 1 1 1 1 1 1
34	C.I | frequency	

	0-15 | 6 15-30 | 7 30-45 | a(f1) 45-60 | 15(f0) 60-75 | 10(f2) 75-90 | b | 51=38+a+b Given that mode of frequency distribution is **55** ,Here given mode **=55** So mode class is **45–60** lower limit (l) **=45** ,class height (h) **=15** then **f0=15** ,**f1=a** ,**f2=10** for a=5 , b= 8	1 1 1 2
35	Total surface area of the article =Curved surface area of the cylinder +2 surface area of a hemispher **$=2\pi rh+2(2\pi r^2)$** **$=2\pi r(h+2r)$** **$=2\times22/7\times3.5(10+2\times3.5)cm2$** $=374\ cm^2$	1 1 2 1
	SECTION – E	
36	(i) a=30 , d=10 No. of seats in 10th row=$a_{10}=a+9d$ $=30+9\times10=30+90=120$ (ii)$S_n=\frac{n}{2}[2a+(n-1)d]$ $\Rightarrow 1500=\frac{n}{2}[2\times30+(n-1)\times10]$ $\Rightarrow 3000=50n+10n^2$ $\Rightarrow (n+20)(n-15)=0$ $\Rightarrow n=-20\ ,n=15$ OR total no. of seats upto 10th row=$S_{10}=\frac{10}{2}[2\times30+(10-1)\times10]=5(60+90)=5\times150=750$ No. of seats still required to be put=1500-750=750 (iii)If no. of rows=17 Then middle is the 9th row, $a_9=a+8d$ $=30+80=110\ seats$	1 2 1
37	(i) Given that the coordinates of P are (-200, 0) and of Q are (200, 0). Therefore, PQ = 400 Since, PQRS is a square, therefore, PQ = PS = RS = QR = 400 R(200,400) , S(-200,400)	1 1

	(ii) Length of diagonal PR: In Square PQRS, $PR^2 = (400)^2 + (400)^2 = 320000$ PR = 400 $\sqrt{2}$ units (iii) We know that, Area of square = $side^2$ We just calculated that side PQ = 400 $\therefore$ Area = $(400)^2$ = 160,000 sq. units OR Given that the coordinates of point A are (200, 800) By graph, we can note that the coordinates of point C are (-600, 0). Coordinates of S we already have as (-200,400) By using section formula for internal division, we get coordinates of S -200 = K(200)+1(-600) K=1	2
38.	(i)Let θ be the angle of elevation. $\Rightarrow \tan\theta = \frac{42}{42} \Rightarrow \tan\theta = 1 = \tan 45° \Rightarrow \theta = 45°$ (ii)$\tan 60° = \frac{42}{x} \Rightarrow \sqrt{3} = \frac{42}{x} \Rightarrow x = \frac{42}{\sqrt{3}} = \frac{42\times\sqrt{3}}{\sqrt{3}\times\sqrt{3}} = \frac{42}{3}\sqrt{3} = 14\sqrt{3}$m OR, $\tan 60° = \frac{h}{20} \Rightarrow h = 20\sqrt{3}\, m$ (iii)$\tan 30° = \frac{21}{x} \Rightarrow \frac{1}{\sqrt{3}} = \frac{21}{x} \Rightarrow x = 21\sqrt{3}\, m$	1 2 1