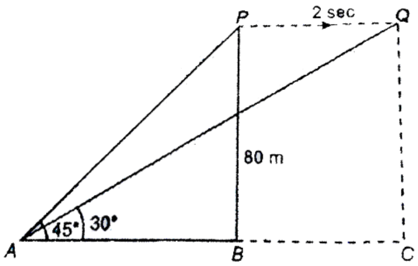
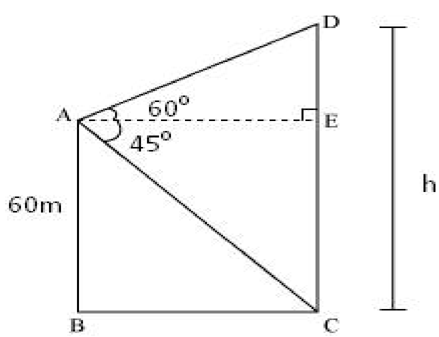
KENDRIYA VIDYALAYA SANGATHAN BHOPAL REGION
FIRST PRE-BOARD EXAMINATION 2020-21
Class- X Mathematics-Basic (241)
(SET-C)
Marking Scheme

Q1. 2 x 3 x 3 x 13 or $2^1 \times 3^2 \times 13^1$	1
Q2. $x^2 - 2\sqrt{3}x + 2$	1
Q3. a = 20 OR For Correct statement	1
Q4. $k \neq 2$	1
Q5. 2n	1
Q6. 339.12 cm^2 or 108π	1
Q7. 60^0 OR No	1
Q8. 22275/28 cm^2 or 795.53 cm^2	1
Q9. 30^0	1
Q10. 90^0	1
Q11. 20	1
Q12. 8	1
Q13. 30 and 20	1
Q14. 13/17 OR 1/4	1
Q15. 100 m	1
Q16. 1/8	1
Q17. (i) (b) (ii) (c) (iii) (c) (iv) (-3,0) (v) 24 sq units	1 Each(Max4)
Q18. (i) (c) (ii) (b) (iii) (b) (iv) (b) (v) (a)	1 Each(Max4)
Q19. (i) (c) (ii) (a) or (b) (iii) (b) (iv) (d) (v) (c)	1 Each(Max4)
Q20. (i) (d) (ii) (a) (iii) (b) (iv) (c) (v) (d)	1 Each(Max4)
Q21. Let P(- 1, 6) divides the line joining A(-3,10) & B(6,-8) in the ratio $m_1 : m_2$. Using section formula $(-1,6) = (\frac{m_1 \times 6 + m_2 \times (-3)}{m_1 + m_2}, \frac{m_1 \times (-8) + m_2 \times (10)}{m_1 + m_2})$	1
Comparing like coordinates $-1 = \frac{6m_1 - 3m_2}{m_1 + m_2}$ *or* $-m_1 - m_2 = 6m_1 - 3m_2$ *or* $7m_1 = 2m_2$ *or* $m_1/m_2 = 2/7$	1
OR Using distance formula, we have d=10 units so $10 = \sqrt{(2 - 10)^2 + (-3-y)^2}$ squaring both sides $100 = (-8)^2 + (9 + y^2 + 6y)$ $100 = 64 + 9 + y^2 + 6y$	1
$y^2 + 6y - 27 = 0$ $y^2 + 9y - 3y - 27 = 0$ $y(y + 9) - 3(y + 9) = 0$ $(y-3)(y+9) = 0$ y=3 or y=-9	1
Q22. For statement	1

For diagram For proof	1 1
Q23. As the length of tangent drawn from an external point to a circle are equal therefore AP=AS, PB=BQ, CR=CQ, RD=DS Adding above, AP+PB+ CR + RD =AS+BQ+ CQ + DS =>AB+CD=AD+BC	 1 1
Q24. Draw a line segment AB of 8 cm. Draw an acute angle BAX. Take arc A1, A2, A3 ,A4, A5 on ray AX. Such that AA1 = A1A2 = A2A3 = A3A4 = A4A5. Joint B and A5. Draw a line CA3 parallel to BA5. Hence we get AC : CB = 3 : 2.	 1 1
Q25. sin (20^0+ **θ**) = cos 30^0 => sin (20^0+ **θ**) = sin (90^0- 30^0) => 20^0+ **θ** = 90^0-30^0 => **θ** = 60^0-20^0 => **θ** = 40^0 OR As $\boldsymbol{cos\theta = \frac{2}{3}, \tan\theta = \frac{\sqrt{5}}{2}\ and\ sec\theta = \frac{3}{2}}$ Now ***$2\ sec^2\vartheta + 2\ tan^2\vartheta - 7$ =2(9/4)+2(5/4)-7 =7-7 =0***	 1 1 1 1
Q26. In given A.P. 3,8,13,18,......78; a=3, d=a_2-a_1=8-3=5 Let nth term of the A.P. be 78 a_n=a+(n-1)d 78 = 3+(n-1)×5 n=16	1 1
Q27. n^3 - n = n(n^2-1) = n(n -1)(n + 1) is divided by 3 then possible reminder is 0, 1 and 2 [∵ if P = ab + r , then 0 ≤ r < a by Euclid lemma] ∴ Let n = 3r , 3r +1 , 3r + 2 , where r is an integer Case 1 :- when n = 3r Then, n^3 - n is divisible by 3 [∵n^3 - n = n(n-1)(n+1) = 3r(3r-1)(3r+1) , which is divisible by 3] Case2 :- when n = 3r + 1 Then, n^3 - n = (3r + 1)(3r)(3r + 2) , it is divisible by 3 Case 3:- when n = 3r - 1 Then, n^3 - n = (3r -1)(3r -2)(3r) , it is divisible by 3 So n^3 - n is divisible by 3 , where n is any positive integers Now n^3 - n = n(n^2-1) = n(n -1)(n + 1)= (n -1)n(n + 1) which is the product of three consecutive integers out of which at least one must be even. Hence given expression must be divisible by 6.	 1 1 1
Q28. We know that, the lengths of tangents drawn from an external point to a circle are equal. ∴ TP = TQ In ΔTPQ, TP = TQ ⇒ ∠TQP = ∠TPQ ...(1) (In a triangle, equal sides have equal angles opposite to them) ∠TQP + ∠TPQ + ∠PTQ = 180º (Angle sum property) ∴ 2 ∠TPQ + ∠PTQ = 180º (Using(1)) ⇒ ∠PTQ = 180º – 2 ∠TPQ ...(1) We know that, a tangent to a circle is perpendicular to the radius through the point of	 ½ 1

contact. OP ⊥ PT, ∴ ∠OPT = 90º ⇒ ∠OPQ + ∠TPQ = 90º ⇒ ∠OPQ = 90º – ∠TPQ ⇒ 2∠OPQ = 2(90º – ∠TPQ) = 180º – 2 ∠TPQ ...(2) From (1) and (2), we get ∠PTQ = 2∠OPQ	½ 1
Q29. Let the number of Rs 50 notes and Rs 100 notes be x and y. According to the question, ⇒ x + y = 25 ... (i) and 50x + 100y = 2000 ... (ii) Multiplying equation (i) by 50, we get 50x + 50y = 1250 ... (iii) Subtracting equation (iii) from equation (ii), we get 50y = 750 **⇒ y = 15** Putting this value in equation (i), we have **⇒ x = 10**	 1 1 1
Q30. Total no of cards i.e. outcomes are 25 (i) cards marked with numbers which are multiples of 3 are 3,9,15,21,27,33,39 and 45 So,P (getting a number divisible by 3)= 8/25 (ii) P (not a perfect square)=1-P (perfect square)=1-3/25=22/25 (iii) P (multiple of 3 and 5)=2/25	 1 1 1
Q31. Height of cone=24 & Radius=6cm Vol of cone=1/3πr^2h =1/3π x6^2x24 =288πcm^3 Let the vol of sphere= 4/3πr^3 Vol of sphere=Vol of cone 4/3πr^3=288π r=6cm Therefore the radius of sphere is 6cm Surface area of sphere =4πr^2 =4xπx6^2 = 144 π cm^2	 1 1 1
Q32. Given cosA/(1+sinA) +(1+sinA)/cosA On taking the LCM we get, ={$\cos^2$A +$(1+\sin A)^2$}/cosA.(1+sinA) using $\sin^2$A+$\cos^2$A =1 =(1+1+2sinA)/cosA(1+sinA) =2(1+sinA)/cosA(1+sinA) =2/cosA =2secA	 1 1 1
Q33. Let the altitude of the triangle be x cm and its base = (x + 10) cm. Area of triangle = 1/2 × Base × height**= 1/2 × x × (x + 10)** According to the Question, ⇒ **1/2x(x + 10) = 600** ⇒ **x^2 + 10x - 1200 = 0** ⇒ (x + 40) (x - 30) = 0 ⇒ **x = - 40, 30** (As x can't be negative) ⇒ **x = 30** Altitude of triangle **= x =** 30 cm Base of triangle **= x + 10 = 30 + 10 =** 40 cm Using Pythagoras theorem, hypotenuse = 50 cm OR	½ ½ 1.5 ½

Let the numbers are x, x+1, x+2	½
As per the question,	
$x^2 +(x+1)(x+2) = 46$	1
i.e. $2x^2 +3x+44 = 0$.	
Now, By solving equation, x= -22/4, 4.	1
But x can't be negative. So, Numbers will be 4,5 and 6.	1/2
Q34.	
	1
Let P be the position of a bird at the height of 80 m with the angle of elevation 45∘	
from A.	
Let after 2 seconds, it reaches, at Q from where its angle of elevation is 30∘.	
Now, in right ΔPBA,	
$\tan 45^0 = PB/AB \Rightarrow 1 = 80/AB$	1
$\Rightarrow AB = 80m$...(1)	
In right ΔQCA,	
$\tan 30^0 = QC/AC \Rightarrow 1/\sqrt{3} = 80/AC$	
$\Rightarrow AC = 80\sqrt{3}\ m$...(2)	1
$\therefore BC = AC - AB$	
$= 80\sqrt{3} - 80 = 80(\sqrt{3} - 1)$	
$= 80(1.732 - 1) = 80 \times 0.732 = 58.56m$	1
Now, speed of bird =Distance/time=58.56m/sec=29.28m/sec.	1
OR	
	1
Let the height of the opposite house be DC=h metre	
In r.t. ΔADE,	
$\tan 60^0 = DE/AE$	
$\sqrt{3} = h - 60/AE$	1
$AE = (h - 60)/\sqrt{3}$..(i)	
If r.t. ΔACE,	
$\tan 45^0 = CE/AE$	1
$AE = 60$..(ii)	
Comparing (i) and (ii), we get	
$(h - 60)/\sqrt{3} = 60$	1

$h-60=60\sqrt{3}$ $h=60\sqrt{3}+60$ $h=60(1+\sqrt{3})$ Therefore, height of the opposite house is $60(1+\sqrt{3})$ metre.	 1
Q35. a_2 = 14 and a_3 = 18 Common difference = a_3 - a_2 = 18 - 14 = 4 = d Now a_2 = a+d=14 a+4=14 a = 10 Using formula for sum of first n terms of an A.P. Now, sum of 51 terms ={51(2a+(50)d)}/2 ={51(20+200)}/2 ={51×220}/2 =51×110=5610 Therefore sum of 51 terms is 5610	 1 1 1 2
Q36. Using formula & finding Mean=149.8 Using formula & finding Median=151.5	2.5 2.5