Marking Scheme

PRACTICE TEST

KVS LUCKNOW REGION 2020-21

CLASS-X **SUBJECT- MATHEMATICS(BASIC)-241** **Max. Marks: 80**

	PART-A	
	SECTION-I	Marks
Q.1	"product of two numbers" **OR** a x b or ab	1
Q.2	"1"	1
Q.3	"non terminating non repeating." **OR** "terminating"	1 1
Q.4	"3" or "three"	1
Q.5	For correct condition of no solution For k = $\frac{-10}{3}$	½ ½
Q.6	"consistent"	1
Q.7	For correct statement of Basic Proportionality theorem **OR** "proportional"	1 1
Q.8	$sin^2\theta + \frac{1}{1+tan^2\theta} = sin^2\theta + \frac{1}{sec^2\theta}$ $= sin^2\theta + cos^2\theta =1$ **OR** sin θ = $\sqrt{3}$ cos θ. $\frac{\sin\theta}{cos\,\theta} = \sqrt{3}$ tan θ = tan 60^0 $\theta = 60°$	½ 1/2 ½ 1/2
Q.9	tan $\theta = \frac{h}{\sqrt{3}h} = \frac{1}{\sqrt{3}}$ = tan 30° $\theta = 30°$	½ ½
Q.10	"right angle" or 90^0	1
Q.11	Area of semicircle=$\frac{1}{2}\pi r^2 = 7700\ sq.m$ $\therefore r = 70\ m$ $\therefore\ diameter\ = 2r\ = 140\ m$	½ ½
Q.12	Length of arc =$\frac{\theta}{360°} \times 2\pi r$	1
Q.13	Volume of cylinder: Volume of cone =$\frac{\pi r^2 h}{\frac{1}{3}\pi r^2 h}$ =3:1	½ ½
Q.14	Mode = 3 Median – 2 Mean	1
Q.15	The probability of an impossible event is 0.	1

	OR P(getting 7 on the upper face of a die) = 0	1
Q.16	P(not E) = 1- P(E) P(not E) =1-0.95 = 0.05	½ ½
	SECTION-II	
Q.17	**Case Study-1**	
	i) Correct option is : d) parabola	1
	ii) Correct option is : a) 2	1
	iii) Correct option is : b) -1, 3	1
	iv) Correct option is : c) x^2 -2x – 3	1
	v) Correct option is : d) 0	1
Q.18	Case Study-2 **Beehive**	
	i) Correct option is : a) 6	1
	ii) Correct option is : c) both similar and congruent	1
	iii) Correct option is : a) 6	1
	iv) Correct option is : d) $9\sqrt{3}$ sq. units	1
	v) Correct option is : b) $54\sqrt{3}$ sq. units	1
Q.19	Case Study-3 **Plotter**	
	i) Correct option is : b) (16,8)	1
	ii) Correct option is : c) (13,10), (19,10), (19,6), (13,6)	1
	iii) Correct option is : b) 1	1
	iv) Correct option is : a) (0,8)	1
	v) Correct option is : b) (16,0)	1
Q.20	Case Study-4 **WATER SUMP**	
	i) Correct option is : b) x-2	1
	ii) Correct option is : b) 20 m3	1
	iii) Correct option is : a) 38 m^2	1
	iv) Correct option is : c)Rs.1520	1
	v) Correct option is : $d)20000\ litres$	1
	PART-B	
Q.21	given AP: -4, 4, 12, 20, ……. ∴ a=-4, d = 4-(-4) = 4+4 =8 a_{15} = a + 14 d = -4 +14x8 = -4 + 112 = 108	 1 1
Q.22	For correct: Given, To prove and Construction For correct proof of the theorem **OR** BD= speed x time = 1.2 m/s × 4 s = 4.8 m $as\ \Delta CDE \cong \Delta ABE$ ∴ $\frac{DE}{BE} = \frac{CD}{AB}$ $\frac{DE}{4.8+DE} = \frac{0.9}{3.6}$,DE=1.6 m	1 1 1 1

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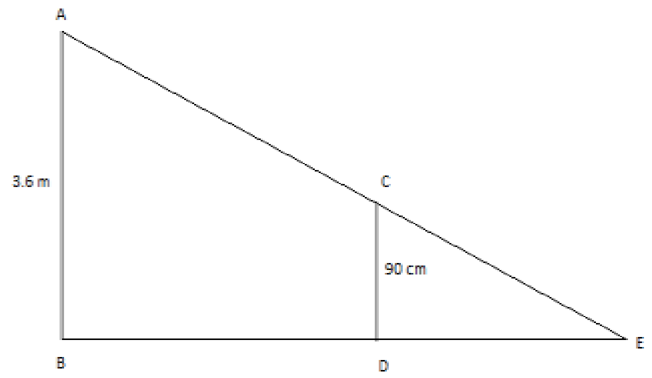
<tr><td></td><td>
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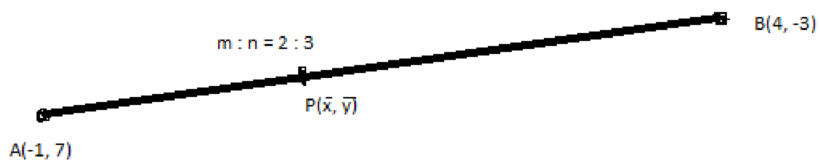
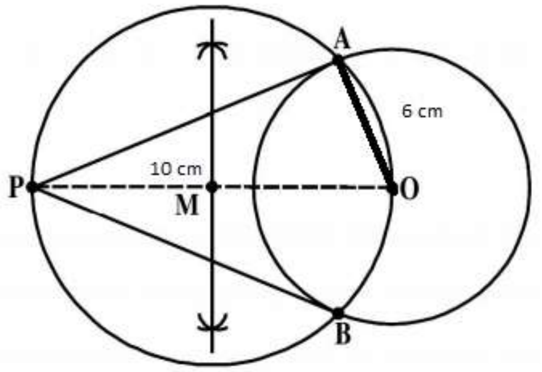
<tr><td>Q.23</td><td>

For using correct section formula
For finding correct value of x coordinate (x=1)
For finding correct value of y coordinate (y=3)
OR
Y coordinate on x-axis is 0 i.e let required point be P(x, 0)
For correct use of distance formula: d =$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
For finding correct coordinates of required point: P(-7, 0)</td><td>1

1

½
½
1</td></tr>
<tr><td>Q.24</td><td>For putting correct values of trigonometric ratios
For finding correct value of $2tan^2 45^0 + cos^2 30^0 - sin^2 60^0$ =2</td><td>1
1</td></tr>
<tr><td>Q.25</td><td>For correct construction


For neatness</td><td>3/2

½</td></tr>
<tr><td>Q.26</td><td>For correct figure
Using Pythagoras theorem to find half chord= 4 cm
Using theorem to find the length of chord =8 cm</td><td>½
1
1/2</td></tr>
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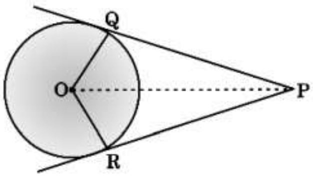
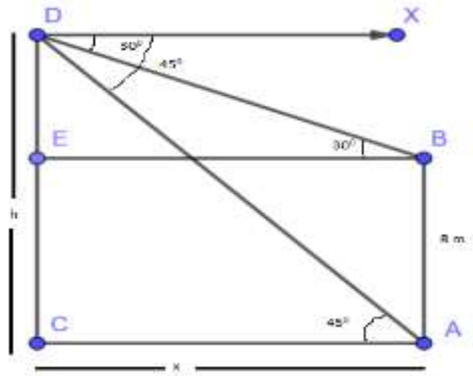
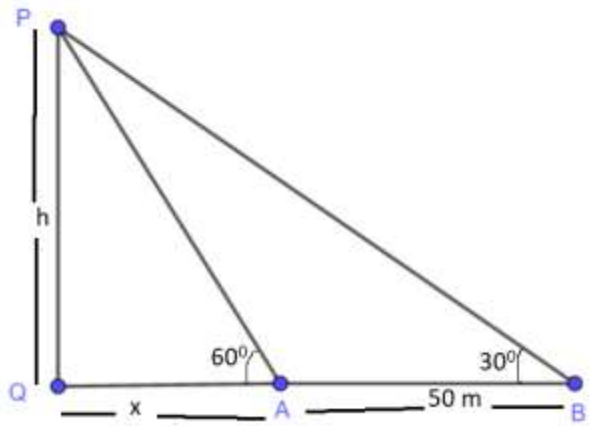
Q.27	Let us assume, to the contrary, that $\sqrt{5}$ is rational. That is, we can find integers a and b (≠ 0) such that $\sqrt{5} = \frac{a}{b}$ · , and assume that a and b are coprime. So, $\sqrt{5}$ b = a Squaring on both sides, and rearranging, we get $5b^2 = a^2$. Therefore, a^2 is divisible by 5, and by Theorem 1.3, it follows that a is also divisible by 5. So, we can write a = 5c for some integer c. we get $5b^2 = 25a^2$, that is, $b^2 = 5a^2$. This means that b^2 is divisible by 5, and so b is also divisible by 5 (using Theorem 1.3 with p = 5). Therefore, a and b have at least 5 as a common factor. But this contradicts the fact that a and b are coprime. This contradiction has arisen because of our incorrect assumption that $\sqrt{5}$ is rational. So, we conclude that $\sqrt{5}$ is irrational.	1 1 1
Q.28	Let the required fraction be x/y According to problem, $\frac{x-1}{y} = \frac{1}{3}$ or $3x - y = 3$ ....(1) again $\frac{x}{y+8} = \frac{1}{4}$ or $4x - y = 8$ ....(2) on solving equation 1 and 2 we get, x = 5 and y =12 therefore required fraction is $\frac{5}{12}$	½ ½ ½ 1 ½
Q.29	$6x^2 - 7x + 2 = 0$, comparing with a$x^2 + bx + c = 0$ we get a=6, b= -7, c= 2 Discriminant, D = b^2- 4 ac = $(-7)^2$-4(6)(2) = 1 > 0 Given equation has real roots. X =$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$, X = $\frac{-(-7) \pm 1}{2 \times 6}$ = 2/3 , ½ **OR** $3x^2 - 2\sqrt{6}x + 2 = 0,$ $\Rightarrow (\sqrt{3}\,x)^2 - 2(\sqrt{3}\,x)(\sqrt{2}\,) + (\sqrt{2}\,)^2 = 0$ $\Rightarrow (\sqrt{3}\,x - \sqrt{2}\,)^2 = 0$ $\Rightarrow \sqrt{3}\,x - \sqrt{2} = 0$ and $\sqrt{3}\,x - \sqrt{2} = 0$ $\Rightarrow x = \frac{\sqrt{2}}{\sqrt{3}}, \frac{\sqrt{2}}{\sqrt{3}}$ **or x =** $\sqrt{\frac{2}{3}}, \sqrt{\frac{2}{3}}$	1 ½ ½ 1 1 1 1
Q.30	$1 + \frac{\cot^2 \alpha}{1 + cosec\,\alpha} = cosec\,\alpha$ LHS = $1 + \frac{\cot^2 \alpha}{1+cosec\,\alpha}$ $= 1 + \frac{\operatorname{cosec}^2 \alpha - 1}{1 + cosec\,\alpha}$ $= 1 + \frac{(cosec\,\alpha + 1)(cosec\,\alpha - 1)}{1 + cosec\,\alpha}$ $= 1 + cosec\,\alpha$-1 $= cosec\,\alpha$ = RHS hence proved	1 1 1

	OR $\tan^4\theta + \tan^2\theta = sec^4\theta - sec^2\theta$ LHS $= \tan^4\theta + \tan^2\theta$ $= \tan^2\theta(\tan^2\theta + 1)$ $= (\sec^2\theta - 1)(sec^2\theta)$ $= sec^4\theta - sec^2\theta$ $= RHS$ hence proved	1 1 1
Q.31	For Given, To prove, Construction For correct proof **Given :** A circle $C(O, r)$ and two tangents say PQ and PR from an external point P. **To prove :** $PQ = PR$.  **Construction :** Join OQ, OR and OP. **Proof :** In ΔOQP and ΔORP $OQ = OR$ (radii of the same circle) $OP = OP$ (Common) $\angle Q = \angle R$ = each 90° (The tangent at any point of a circle is perpendicular to the radius through the point of contact) Hence $\Delta OQP \cong \Delta ORP$ (By RHS Criterion) $\therefore$ $PQ = PR$ (By CPCT) **Hence Proved.**	3/2 3/2
Q.32	Volume of sphere=$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 10.5 \times 10.5 \times 10.5$ Volume of cone =$\frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 3.5 \times 3.5 \times 3$ Required number of cones can be formed = $\frac{\frac{4}{3}\pi \times 10.5\times10.5\times10.5}{\frac{1}{3}\pi \times3.5\times3.5\times3}$ = 126	1 1 1
Q.33	Since pack of playing have 52 cards, therefore n(S)=52 i) Let A: getting king of black colour n(A)=2 P(A)=$\frac{n(A)}{n(S)} = \frac{2}{52} = \frac{1}{26}$ ii) Let B: getting red colour or jack n(B)=28 P(B)=$\frac{n(B)}{n(S)} = \frac{28}{52} = \frac{7}{13}$ iii) Let C: getting not a face card n(C)=40 P(C)=$\frac{n(C)}{n(S)} = \frac{40}{52} = \frac{10}{13}$	½ ½ ½ ½ ½ ½
Q.34	Given AP: 20, 17, 14, 11, ……………….. Let $a_n = -82$, d = 17-20 = -3 $\Rightarrow a + (n-1)d = -82$	1

	$\Rightarrow 20 + (n-1)(-3) = -82$	½
	$\Rightarrow 20 - 3n + 3 = -82$	
	$\Rightarrow -3n = -82 - 23$	
	$\Rightarrow -3n = -105$	1
	$\Rightarrow n = 35$ $\therefore$ 35^{th} term is -82	
	Now suppose m th term is zero then	½
	$a + (m-1)d = 0$	½
	$20 + (m-1)(-3) = 0$	
	$m = \frac{23}{3}$ which is not possible	1
	0 is not any term of given AP	½
Q.35	For correct figure	1
		
	In ΔACD,	
	tan 45^0=$\frac{CD}{AC}$	
	1=$\frac{h}{x}$ $\Rightarrow x = h$ ………………(1)	
	Again in ΔBED,	1
	tan 30^0=$\frac{ED}{EB}$	
	$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h-8}{x}$	1
	$\Rightarrow x = h\sqrt{3} - 8\sqrt{3}$	
	$\Rightarrow h - h\sqrt{3} = -8\sqrt{3}$	1
	$\Rightarrow h = \frac{8\sqrt{3}}{\sqrt{3}-1}$	
	$\Rightarrow h = 12 + 4\sqrt{3}$ $= 18.93$ m (using $\sqrt{3}$ $= 1.732$)	
	Hence x=h=$12 + 4\sqrt{3}$ $= 18.93$ m	1
	OR	
	For correct figure	1
		
	In ΔPQA,	
	tan 60^0=$\frac{PQ}{AQ}$	
	$\sqrt{3} = \frac{h}{x} \Rightarrow h = x\sqrt{3}$	1
	……………………(1)	
	Again in ΔPQB,	
	tan 30^0=$\frac{PQ}{BQ}$	1
	$\frac{1}{\sqrt{3}} = \frac{h}{x+50}$	
	$\Rightarrow x + 50 = h\sqrt{3}$	1
	$\Rightarrow x + 50 = x\sqrt{3} \times \sqrt{3}$	
	$\Rightarrow 50 = 3x - x$	
	$\Rightarrow x = 25$	1

	Now $h=25\sqrt{3}$ m ,using equation (1)	

Q.36

Calculation of mean:

Height (in cm)	Number of girls (f)	Class-mark (x)	d=x-A	F x d
135-140	4	137.5	-10	-40
140-145	7	142.5	-5	-35
145-150	12	147.5 (A)	0	0
150-155	15	152.5	5	75
155-160	10	157.5	10	100
160-165	2	162.5	15	30
	$\varepsilon f = 50$			$\varepsilon f d = 130$

For finding class mark ½

For finding ,$\varepsilon f d = 130$ 1

Mean = A + $\frac{\varepsilon f d}{\varepsilon f}$

= 147.5 + $\frac{130}{50}$

= 147.5 + 2.6=150.1

1

Calculation of median:

Height (in cm)	Number of girls (f)	C F	
135-140	4	**4**	
140-145	7	**11**	
145-150	12	**23(CF)**	
150-155	15(f)	**38**	
155-160	10	**48**	
160-165	2	**50**	
	$\varepsilon f = 50$		

½

N/2 = 50/2 = 25

Median class is (150-155)

l= 150, CF=23, f = 15, h = 5

Median = l +$\left(\frac{\frac{N}{2}-CF}{f}\right)h$

= 150+($\frac{25-23}{15}$) $\times$ 5 1

=150+0.67

=150.67 1