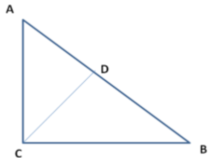
# WWW.MATHSTIMES.COM|CBSE 11|MODEL PRACTICE PAPER 2017-18
## MARKING SCHEME
## CLASS-X|MATHEMATICS
## MATHEMATICS

| | | |
|---|---|---|
| | **SECTION -A** | |
| **1** | n=2 | 1 |
| **2** | Given numbers are in AP<br>(k+10) - 2k = 3k +2 –(k +10)<br>Or k = 6 | 1 |
| **3.** | As DE II BC ,by BPT<br>AD /DB = AE /EC<br>Or AD = 2.4 cm | <br>1 |
| **4.** | sin 30° =1/2 and cos 60° =1/2<br>α + β =90° | 1 |
| **5.** | $k = \pm 2\sqrt{6}$ | 1 |
| **6.** | p= $\frac{-5+11}{2}$ =3 | 1 |
| | **SECTION -B** | |
| **7.** | HCF X LCM = 90x144<br>18 X LCM=90x144<br>LCM = 720 | <br>1<br>1 |
| **8.** | Let the first term=a and the common difference =d<br>a+16d=a+9d+7<br>d=1 | <br>1<br>1 |
| **9.** | For Infinite solutions $\frac{a1}{a2}=\frac{b1}{b2}=\frac{c1}{c2}$<br>$\frac{k-5}{k}=\frac{1}{2}$<br>$\Rightarrow k=10$ | ½<br>½<br>1 |
| **10.** | $area = \frac{[a(c+a-a-b)+b(a+b-b-c)+c(b+c-c-a)]}{2}$<br>$= \frac{ac-ab+ab-bc+bc-ac}{2} = 0$<br>The given points are collinear. | 1<br>½<br>½ |
| **11.** | (i)P( a prime number)= $\frac{7}{17}$ | 1 |

| | | |
|---|---|---|
| | (ii)P( a multiple of 3)= $\frac{5}{17}$ | 1 |
| **12.** | P(a non face card)=10/13<br>P(a black king or red queen)=1/13 | 1<br>1 |
| | **SECTION C** | |
| **13** | Let 5+√3 is a rational number .So 5+√3 = $\frac{a}{b}$ where a & b are co-prime integers and b≠0<br>After simplification √3=$\frac{a-5b}{b}$<br>Which contradicts the fact that √3 is an irrational number and hence 5+√3 is an irrational number. | 1<br>1<br>1 |
| **14.** | 1. Let f(x)=$x^4 + 3x^3 – 20x^2 – 6x + 36$<br>Since $\sqrt{2}$ and -$\sqrt{2}$ are zeroes of f(x)<br>∴ $(x-\sqrt{2})(x+\sqrt{2}) = x^2 – 2$ is a factor of f(x)<br>Division algorithm, we have $x^4 + 3x^3 – 20x^2 – 6x + 36$<br>$= (x^2 – 2)(x^2 + 3x – 16)$<br>$=(x^2 – 2)(x+6)(x-3)$<br>∴ The other zeroes are -6 and 3<br>**OR**<br>$5x^2 – 4 – 8x = 5x^2 – 8x – 4$<br>$= 5x^2 –10x + 2x –4$<br>$=(5x+2)(x-2)$<br>Zeroes are -2/5, 2<br>Sum of zeroes $2+\left(\frac{-2}{5}\right) = \frac{8}{5} = \frac{-coefficent\ of\ x}{coefficient\ of\ x^2}$<br>Product of zeres = $2\left(\frac{-2}{5}\right) = \left(\frac{-4}{5}\right) = \frac{constant\ term}{coefficient\ of\ x^2}$ | 1<br>$1\frac{1}{2}$<br>½<br>1<br>1<br>1 |
| **15.** | Finding correct set of solutions for the pair of equations .<br>Correct plotting of points on graph and joining of points.<br>Shading of the triangular region enclosed with X –axis. | 1<br>$1\frac{1}{2}$<br>½ |
| **16** | Given, To prove ,figure and construction | |

Proving $\Delta ACB \sim \Delta CDB$ (by AA similarity) 1




$$\frac{AB}{BC} = \frac{AC}{CD}$$
$$\Rightarrow \frac{c}{a} = \frac{b}{p}$$
$$\Rightarrow cp = ab$$

1

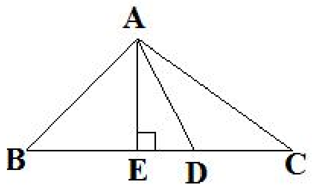
(ii)$AB^2=BC^2+ AC^2$

$c^2=a^2+b^2$

$$\Rightarrow \frac{c^2}{a^2b^2} = \frac{a^2+b^2}{a^2b^2}$$
$$\Rightarrow \frac{c^2}{c^2p^2} = \frac{a^2}{a^2b^2} + \frac{b^2}{a^2b^2}$$
$$\Rightarrow \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{a^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

1

**OR**




Given, To prove, figure and construction

In $\Delta ADE$, $AD^2=AE^2+ED^2$ (Pythagoras theorem)

$AE^2=AD^2-DE^2$ 1

In $\Delta ABE$, $AB^2=AE^2+BE^2$ ($\angle B=90^0$, Pythagoras theorem)

$AB^2=AD^2-DE^2+(BD-DE)^2$ Using (I)

$AB^2=AD^2+BD^2-2BD.DE$ .....(II)

In $\Delta ACE$, $AC^2=AE^2+EC^2$ 1

$AC^2 = AD^2 - DE^2+(CD+DE)^2$

$AC^2 = AD^2+CD^2+2CD.DE$

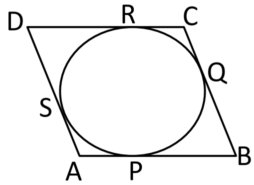
$AC^2 = AD^2+BD^2+2BD.DE$ (As BD=CD) .... (III)

Adding (II) and (III) $AB^2+AC^2=2(AD^2+BD^2)$

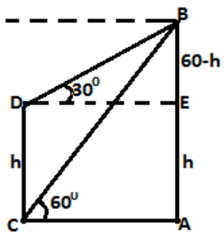
1

**17.** $$\frac{\sin 25^\circ}{\cos 65^\circ} + \frac{\cot 15^\circ}{\tan 75^\circ} + \frac{2\cos 43^\circ \operatorname{cosec} 47^\circ}{\tan 10^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ}$$

1

| | | |
|---|---|---|
| | $=\frac{\sin(90°-65°)}{\cos 65°}+\frac{\cot(90°-75°)}{\tan 75°}+\frac{2\cos 43°\,cosec(90°-43°)}{\tan(90°-80°)\tan(90°-50°)\tan 50°\tan 80°}$ <br> $=\frac{\cos 65°}{\cos 65°}+\frac{\tan 75°}{\tan 75°}+\frac{2\cos 43°\sec 43°}{\cot 80°\cot 50°\tan 50°\tan 80°}$ <br> $=1+1+\frac{2}{1\times 1}=4$ | 1 <br> 1 |
| **18.** | PQ=$5\sqrt{10}$ <br> QR=$\sqrt{26}$ <br> RS=$5\sqrt{10}$ <br> SP=$19\sqrt{2}$ <br> Here QR≠ SP. So quadrilateral PQRS is not a parallelogram. <br> **OR** <br> Let P(x,0) is equidistant from point A(2, -5) and B(-2, 9) <br> AP = BP <br> $\sqrt{(x-2)^2+(0+5)^2}=\sqrt{(x+2)^2+(0-9)^2}$ <br> x= -7 <br> The point on the x-axis equidistant from the given points is (-7, 0) | 4x½ <br> 1 <br> ½ <br> 1 <br> 1 <br> ½ |
| **19.** | Modal class is 45-60 <br> $l=45, f_1=16, f_0=p, f_2=12, h=15$ <br> $54=45+\frac{16-p}{32-p-12}\times 15$ <br> Or p=10 | ½ <br> 1 <br> ½ <br> 1 |
| **20.** | Area of square ABCD = 14 X 14 = 196 $cm^2$ <br> Diameter = 7cm , r= 7/2 cm <br> Area of 4 circles = 4 X $\frac{22\times 7\times 7}{7\times 2\times 2}$ = 154 $cm^2$ <br> Area of shaded region = Area of square ABCD- Area of 4 circles <br> = 196 – 154 = 42 $cm^2$ | 1 <br> 1 <br> 1 |
| **21.** | We know that the tangents to a circle from an external point are equal in length. <br> AP = AS .....( i ) BP = BQ ..... ( ii ) <br> CR = CQ .....(iii) DR = DS .....( iv ) <br>   <br> Adding (i), (ii), (iii) & (iv), we get <br> ( AP + BP ) + ( CR + DR ) = ( AS + DS ) + ( BQ + CQ ) <br> or, AB + CD = AD + BC | 4x½ <br> 1 |
| **22.** | Calculating l=20cm <br> Area of metal sheet=$\prod(r_1+r_2)\, l+\prod r_1^2$ <br> =1959.36 $cm^2$ | ½ <br> ½ <br> 1 |

| | | |
|---|---|---|
| | Cost of metal sheet= $Rs\frac{8\times1959.36}{100} = Rs156.75$ | 1 |
| | **OR** | |
| | Radius of hemisphere = $\frac{7}{2}$ = 3.5 cm | |
| | Height of cone = (14.5 – 3.5) = 11cm | ½ |
| | Now, volume of toy = Volume of hemisphere + Volume of cone | ½ |
| | $=\frac{2}{3}\pi r^3+\frac{1}{3}\pi r^2h=\frac{1}{3}\pi r^2(2r+h)$ | 1 |
| | $=\frac{1}{3}\times\frac{22}{7}\times\left(\frac{7}{2}\right)^2(2\times\frac{7}{2}+11)cm^3$ | |
| | $=231cm^3$ | 1 |
| | **SECTION D** | |
| **23.** | $\frac{1}{a+b+x}-\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$ | |
| | $\frac{1}{a+b+x}-\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$ | 1 |
| | $\frac{-(a+b)}{x(a+b+x)}=\frac{a+b}{ab}$ | 1 |
| | or, x ( a + b + x ) + ab = 0 | 1 |
| | $x^2$ + ax + bx + ab = 0 | |
| | x ( x + a ) + b ( x + a ) = 0 or, ( x + a ) ( x + b ) = 0 | |
| | x = – a or x = – b | 1 |
| **24** | Let the $n^{th}$ term of the given AP be the first negative term. | |
| | Then $a_n < 0$ | |
| | or, a + ( n – 1 ) d < 0 | |
| | or, 20 + ( n – 1 ) ( – $\frac{3}{4}$ ) < 0 | 1 |
| | or, 83 – 3n < 0 | |
| | or, 3n > 83 | 1 |
| | or, n > $\frac{83}{3}$ | |
| | or, n > $27\frac{2}{3}$ | 1 |
| | $\therefore$ n ≥ 28 | |
| | Thus, $28^{th}$ term of the given sequence is the first negative term. | 1 |
| **25** | Construction of ΔABC | 1 |

| | | |
|---|---|---|
| | Construction of similar triangle | 3 |
| **26** | Given, To prove ,figure and construction<br>Correct proof | 1<br>3 |
| **27** | $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}$<br>$=\frac{\frac{\sin\theta}{\cos\theta}}{1-\frac{\cos\theta}{\sin\theta}}+\frac{\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}$<br>$=\frac{(\sin\theta)^3-(\cos\theta)^3}{(\sin\theta-\cos\theta)\cos\theta.\sin\theta}$<br>$=\frac{1+\cos\theta.\sin\theta}{\cos\theta.\sin\theta}$<br>$=\frac{1}{\cos\theta.\sin\theta}+\frac{\cos\theta.\sin\theta}{\cos\theta.\sin\theta}$<br>$=\sec\theta.cosec\theta+1$<br>**OR**<br>$\sec\theta+\tan\theta=p$<br>$\Rightarrow\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}=p$<br>$\Rightarrow\frac{(1+\sin\theta)^2}{1-\sin^2\theta}=p^2$<br>$\Rightarrow\frac{1+\sin\theta}{1-\sin\theta}=p^2$<br>$\Rightarrow\frac{p^2+1}{p^2-1}=\frac{1+\sin\theta+1-\sin\theta}{1+\sin\theta-1+\sin\theta}$<br>$\Rightarrow\frac{p^2+1}{p^2-1}=\frac{2}{2\sin\theta}=\frac{1}{\sin\theta}$<br>$\Rightarrow\frac{p^2-1}{p^2+1}=\sin\theta$ | 1<br>1<br>1<br>1<br><br>1<br>1<br>1<br>1 |
| **28** | <br>For correct figure | 1 |

Let AB = Building, CD = Tower ,AC=DE=x

In, $\Delta$DEB $\tan 30^0 = \frac{BE}{DE}$

or, $\frac{1}{\sqrt{3}} = \frac{60-h}{x}$ or $x = (60 - h)\sqrt{3}$ ..... ( i ) 1

In, $\Delta$ CAB, $\tan 60^0 = \frac{AB}{CA}$ or $\sqrt{3} = \frac{60}{x}$

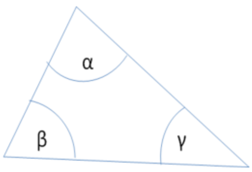
or $x = \frac{60}{\sqrt{3}}$ ......( ii ) 1

From (i) & (ii) $(60-h)\sqrt{3} = \frac{60}{\sqrt{3}}$

or h = 40m 1

Thus, the height of the tower is 40m.

**29**




Area of three sectors

$= \frac{\alpha}{360°} \times \pi r^2 + \frac{\beta}{360°} \times \pi r^2 + \frac{\gamma}{360°} \times \pi r^2 m^2$ 1

$= \frac{(\alpha+\beta+\gamma)}{360°} \times \frac{22}{7} \times 7^2 m^2$ 1

$= 77m^2$

$s = \frac{15+16+17}{2} m = 24m$ ½

Area of the triangle= $\sqrt{s(s-a)(s-b)(s-c)}$

$= 24\sqrt{21} m^2$ 1

Area of the field which can not be grazed by the three animals

= $(24\sqrt{21} - 77)m^2$ ½

**30.**

| Distance (in metres) | Cumulative frequency |
|---|---|
| Less than 20 | 6 |
| Less than 40 | 17 |
| Less than 60 | 34 |
| Less than 80 | 46 |
| Less than 100 | 50 |

1

2

Drawing Ogive 1

Value-Social service (or any other value)

**OR**

| Monthly consumption | Number of consumers | Cumulative frequency |
|---|---|---|
| 65-85 | 4 | 4 |
| 85-105 | 5 | 9 |
| 105-125 | 13 | 22 |
| 125-145 | 20 | 42 |
| 145-165 | 14 | 56 |
| 165-185 | 8 | 64 |
| 185-205 | 4 | 68 |
| Total | 68 | |

1

Median class=125-145

L=125,n=68,f=20 ,cf=22,h=20

$$Median = l + \frac{(\frac{n}{2} - cf)}{f} \times h$$

1

$$= 125 + \frac{(34-22)}{20} \times 20$$

$$= 137$$

Value-Social service (or any other value)

1

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**Note- Proportionate marks are to be awarded for any alternate correct answers .**