AIMS PUBLIC SCHOOL

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Class: 10^{th} **Sub: Math's** **MM: 25**

Q 1. **In ΔABC, $PQ \parallel BC$. Find x if $AP = 5x - 3$, $PB = 2$, $AQ = 2x + 1$ and $QC = 3$.** **/5**

Q 2. Prove the following trigonometric identities. **/5**

(i) $\sin^2\theta = \left(\sec^2\theta - 1\right)\cos^2\theta,$

(ii) $\dfrac{1+\sin\theta}{\cos\theta} = \tan\theta + \sec\theta,$

(iii) $\tan\theta = \sin\theta\sqrt{1+\tan^2\theta},$

(iv) $\cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$

(v) $\sin^3\theta = \sin\theta - \sin\theta\cos^2\theta$

(vi) $\sqrt{\dfrac{1+\cos\theta}{1-\cos\theta}} = \dfrac{\sin\theta}{1-\cos\theta},$

(vii) $\sqrt{\dfrac{\sec\theta+1}{\sec\theta-1}} = \dfrac{\sec\theta+1}{\tan\theta},$

(viii) $\dfrac{\sin^2\theta}{\cos\theta} + \cos\theta = \sec\theta,$

OR

(i) $\sin\theta = \dfrac{\sqrt{3}}{2}$ and θ lies in second quadrant

(ii) $\cos\theta = \dfrac{2}{3}$ and θ lies in fourth quadrant

(iii) $\tan\theta = -\dfrac{1}{2}$ and θ lies in second quadrant

(iv) $\sec\theta =$ $\text{cosec}\theta = \sqrt{2}$ and θ lies in first quadrant

(v) $\cos\theta = \dfrac{1}{2}$ and $\tan\theta$ is positive.

Q 4. Find the inverse by using adjoint method. **/5**

$$I.\begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix}$$

OR

$$II.\begin{bmatrix} 1 & 0 & 1 \\ -4 & 1 & -1 \\ 6 & -2 & 1 \end{bmatrix}$$

OR

$$III.\begin{bmatrix} 1 & -1 & 3 \\ 2 & 1 & 2 \\ -2 & -2 & 1 \end{bmatrix}$$

Q 5. **/5**

i. Draw two unequal circles of radii3.3 cm and 2.1 cm with centres, A and B respectively such that $mAB = 8cm$. Draw direct common tangents to these circles. (Also write Steps of construction)

ii. Circumscribe a square about a circle of radius 4.2cm and with center at point C.

iii. Take a minor arc PQ. Draw a tangent to PQ through its midpoint A without using center. OR Take a major arc PQR. Draw a tangent to PQR through its end point Q without using center.

Q 6. Attempt any one of the following. **/5**

i. If two circles touch externally, the distance between their centres is equal to the sum of their radii. Prove it. **(Theorem number 26.4(case A). page number 217)**

ii. The tangent to a circle and the radial segment joining the point of contact and the centre are perpendicular to each other. Prove it. **(Theorem number 26.2. page number 210)**

iii. A line parallel to one side of triangle and intersecting the other two sides, divides them proportionally. Prove it. **(Theorem number 24.1. page number 184)**

iv. If the square of one side of triangle is equal to the sum of the squares of the other two sides, then the triangle is a right angled triangle. Prove it. **(Theorem number 23.2. page number 177)**