10th STD: Unit Test-2   **MATHEMATICS**   **Time: 1 Hr / Total Marks: 25**

I. Answer the following questions: [5 x 2 = 10]

1. Prove the following identities: $tan^4\theta + tan^2\theta = sec^4\theta - sec^2\theta$

2. Prove the following identities: $\frac{1- tan^2\theta}{cot^2\theta - 1} = tan^2\theta$

3. Prove that $\sqrt{\frac{1 + cos\theta}{1 - cos\theta}} = cosec\theta + cot\theta$

4. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}m$.

5. A road is flanked on either side by continuous rows of houses of height $4\sqrt{3}$ m with no space in between them. A pedestrian is standing on the median of the road facing a row house. The angle of elevation from the pedestrian to the top of the house is 30°. Find the width of the road.

II. Answer the following questions: [3 x 5 = 15]

6. If $\sin\theta (1 + sin^2\theta) = cos^2\theta,$ then prove that $cos^6\theta - 4 cos^4\theta + 8 cos^2\theta = 4$

7. If $\frac{cos\theta}{1+sin\theta} = \frac{1}{a},$ then prove that $\frac{a^2-1}{a^2+1} = sin\theta$

8. The top of a 15 m high tower makes an angle of elevation of 60° with the bottom of an electronic pole and angle of elevation of 30° with the top of the pole. What is the height of the electric pole?

---ALL THE BEST---