Test Title: Hard Trigonometry Test
Description: Create a test on trigonometry
Due Date: Friday, November 7, 2025

1. Objective: Prove the identity:
$$
\sin(3x) = 3\sin(x) - 4\sin^3(x)
$$
Provide a step-by-step proof using trigonometric identities.

2. Short Answer: Solve for all values of x in the interval $[0, 2\pi]$ satisfying the equation:
$$
\cos(2x) + \cos(4x) + \cos(6x) = 0
$$

3. Objective: Verify the identity:
$$
\tan(3x) = \frac{3\tan(x) - \tan^3(x)}{1 - 3\tan^2(x)}
$$
Show your working.

4. Short Answer: Given a zip wire stretched between two posts 25 meters apart with an angle of elevation of 10°, calculate the length of the wire to two decimal places.

5. Short Answer: A surveyor standing 1 meter above the ground measures the angle of elevation to the top of a skyscraper as 82° from a point 50 meters away from its base. Calculate the total height of the skyscraper to one decimal place.

These questions incorporate advanced proof, equation solving, and real-world application problems, suitable for a hard level trigonometry test[2][3][6].