

Max/Min Questions Involving Trigonometric Functions

1. The position of a particle as it moves horizontally is described by the given equations. If s is the displacement in metres and t is the time in seconds, find the absolute maximum and absolute minimum displacements for $s(t) = 2\sin t + \sin 2t$, $-\pi \leq t \leq \pi$
2. Find the maximum perimeter of a right triangle with a hypotenuse of 20 cm.
3. Find the rectangle of greatest area that can be inscribed in the circle $x^2 + y^2 = 36$.
4. A tool shed 3 m high and 2 m deep is built against a wall. Find the length of the shortest ladder that can reach from the ground, over the shed, to the wall behind.

Answers: 1. $-\frac{3\sqrt{3}}{2}, \frac{3\sqrt{3}}{2}$; 2. $20 + 2\sqrt{2}$ cm; 3. 72 square units; 4. 7.02 m