163: \[ \cos(\theta) = \text{side adjacent/hypotenuse} \]
\[ \tan(\theta) = \text{opposite/adjacent} \]

28′(6) A point moves along the curve \[ y = \sqrt{x} \]. The \[ x \]-coordinate increases at 10 feet/sec. The angle of elevation is the angle between the positive \[ x \]-axis and the ray from the origin to the point. How fast is the angle of elevation decreasing when \[ x \] is 3 feet?

Picture & variables

Want

Given

Eq.

Diff.

Ans

30′(6) A streetlight is 16 feet above the ground. A 6 foot man walks toward the streetlight’s base at 10 feet/sec. The length of his shadow is the distance on the ground between his feet and the tip of the shadow. Find the rate of change of his shadow when he is 10 feet from the base of the light.

Picture & variables

There are two similar triangles in the picture

Want

Given

Eq.

Diff.

Ans

36′(6) Pedestrian \( A \) walks from the north toward an intersection \( C \) at 2 meters/second. Pedestrian \( B \) walks eastward away from intersection \( C \) at 1 meter/second. Find the rate of change of the angle \( \theta \) between the ray from \( B \) to \( C \) and the ray from \( B \) to \( A \) (angle \( \angle CBA \) with vertex \( B \)), when \( A \) is 10 meters from \( C \) and \( B \) is 20 meters away.