

Related Rates Assignment

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Question 0

Watch the lecture video [here](#).

Did you watch the video? [Type yes or no.]

Solve the following related rates questions. Convert your final answers to decimals.

Question 1

You are inflating a spherical balloon at the rate of $7 \text{ cm}^3/\text{s}$ [Hint: this is the rate of change of the volume]. How fast is its radius increasing when the radius is 4 cm? [Hint: The volume of a sphere is $V = \frac{4}{3}\pi r^3$.]

Question 2

A road running north to south crosses a road going east to west at the point P. Car A is driving north along the first road, and car B is driving east along the second road (see picture below). At 1:00 car A is 10 km to the north of P and travelling at 80 km/hr, while car B is 15 km to the east of P and travelling at 100 km/hr. How fast is the distance between the two cars changing at 1:00?

Question 3

A man walks along a straight path at a rate of 3 ft/s. A searchlight is located on the ground 30 ft from the path. If the searchlight remains focused on the man, at what rate is the searchlight rotating (in radians per second) when the man is 40 ft from the point on the path closest to the searchlight?

[Assume the man is walking away from the light.]

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[Hint: Use the tangent of the angle.]

