4.5a / Practice workbook

Related Rates: Right Triangles and Angles

Practice

Problems 1–6 / Show your reasoning

1 A kite flies at a constant height of 60 ft and moves horizontally away from the person holding the string at 8 ft/s. How fast is the string being let out when 100 ft of string is out?

2 A plane flies horizontally at an altitude of 3 mi at 480 mph and passes directly over a radar station. How fast is the distance from the plane to the station increasing when that distance is 5 mi?

A. 288 mph
B. 384 mph
C. 480 mph
D. 640 mph

4.5a / AP-style free response

Problem 3 ➤ */ Show the work and the reasons a grader looks for.*

A 10 m ladder leans against a wall. Its foot slides away from the wall at 1 m/s. Let θ be the angle between the ladder and the ground.

(a) Find $\frac{d\theta}{dt}$ when the foot is 6 m from the wall. Show the work that leads to your answer.

(b) Is the angle increasing or decreasing? Give a reason.

4 Two boats leave the same dock at the same time. One goes west at 12 km/h, the other south at 5 km/h. How fast is the distance between them increasing 2 hours later?

A. 13 km/h
B. 17 km/h
C. 26 km/h
D. 7 km/h

4.5a / AP-style free response

Problem 5 ➤ */ Show the work and the reasons a grader looks for.*

A 25 ft ladder leans against a wall. The top slides down the wall at 3 ft/s. How fast is the foot moving away from the wall when the top is 7 ft above the ground?

6 A 13 ft ladder leans against a wall. Its foot slides away from the wall at 2 ft/s. How fast is the top sliding down when the foot is 5 ft from the wall?

4.5a / Answer key

Related Rates: Right Triangles and Angles

1 6.4 ft/s

2 (B)

3 (a) $-\frac{1}{8}$ rad/s; (b) decreasing

4 (A)

5 $\frac{7}{8}$ ft/s

6 $\frac{dy}{dt} = -\frac{5}{6}$: the top slides down at $\frac{5}{6}$ ft/s