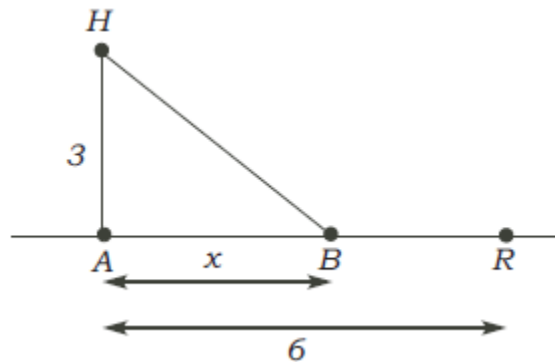


QUIZ 7

ADRIAN PĂCURAR

Time: 15 minutes

Problem 1. A house H is located in the woods, 3 miles from the nearest point, A , on a straight road. A restaurant, R , is located 6 miles down the road from A . Jack can ride his bike 10 miles per hour (mph) in the woods and 20 mph along the road. He decides to ride the bike through the woods to some intermediate point B , x miles from A , and then ride along the road to R . Since he is starving, he wants to minimize his time T .



- (i) Give the relation between velocity v , distance d , and time T . (Circle ALL that apply)

(a) $vd = T$
(b) $vT = d$
(c) $dT = v$
(d) $dv = T$
(e) $v = \frac{d}{T}$
- (ii) Find the distance that Jack must travel through the woods in terms of x .

(a) $x^2 + 9$
(b) x^2
(c) 3
(d) $\sqrt{x^2 + 3}$
(e) $\sqrt{x^2 + 9}$
- (iii) Find the distance that Jack must travel down the road in terms of x .

(a) x
(b) $\sqrt{x^2 + 36}$
(c) 6
(d) $x - 6$
(e) $6 - x$
- (iv) Using what you found in (i) and (ii), find the time Jack spends biking through the woods.

(a) $\frac{x^2+9}{10}$
(b) $\frac{x^2}{10}$
(c) 10
(d) $\frac{\sqrt{x^2+3}}{10}$
(e) $\frac{\sqrt{x^2+9}}{10}$
- (v) Using what you found in (i) and (iii), find the time Jack spends biking down the road.

(a) $\frac{x}{20}$
(b) $\frac{\sqrt{x^2+36}}{20}$
(c) 20
(d) $\frac{x-6}{20}$
(e) $\frac{6-x}{20}$
- (vi) Using the answers you found in (iv) and (v), write down a formula for the total time Jack spends biking from his house to the restaurant.