

2021 AMC 10A Problems/Problem 6

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Problem

Chantal and Jean start hiking from a trailhead toward a fire tower. Jean is wearing a heavy backpack and walks slower. Chantal starts walking at 4 miles per hour. Halfway to the tower, the trail becomes really steep, and Chantal slows down to 2 miles per hour. After reaching the tower, she immediately turns around and descends the steep part of the trail at 3 miles per hour. She meets Jean at the halfway point. What was Jean's average speed, in miles per hour, until they meet?

- (A) $\frac{12}{13}$ (B) 1 (C) $\frac{13}{12}$ (D) $\frac{24}{13}$ (E) 2

Solution 1 (Generalized Distance)

Let d miles be the distance from the trailhead to the fire tower, where $d > 0$. When Chantal meets Jean, the two have traveled for

$$\frac{d}{4} + \frac{d}{2} + \frac{d}{3} = d \left(\frac{1}{4} + \frac{1}{2} + \frac{1}{3} \right) = d \left(\frac{3}{12} + \frac{6}{12} + \frac{4}{12} \right) = \frac{13}{12}d$$

hours. At that point, Jean has traveled for d miles, so his average speed is $\frac{d}{\frac{13}{12}d} = \boxed{\text{(A)} \frac{12}{13}}$ miles per hour.

~MRENTUSIASM

Solution 2 (Specified Distance)

We will follow the same template as shown in Solution 1, except that we will replace d with a convenient constant.

Let 24 miles be the distance from the trailhead to the fire tower. When Chantal meets Jean, the two have traveled for

$$\frac{12}{4} + \frac{12}{2} + \frac{12}{3} = 3 + 6 + 4 = 13$$

hours. At that point, Jean has traveled for 12 miles, so his average speed is $\boxed{\text{(A)} \frac{12}{13}}$ miles per hour.

~MRENTUSIASM

Video Solution 1 (Using Speed, Time, Distance)

<https://youtu.be/hRFMsxhXQd0>

~ pi_is_3.14

Video Solution 2 (Simple and Quick)

<https://youtu.be/vwtGZVJ0TbI>

~ Education, the Study of Everything

Video Solution 3

<https://youtu.be/LonrTINrk94>

~savannahsolver

Video Solution 4 (by TheBeautyofMath)

<https://youtu.be/cckGBU2x1zg>

~IceMatrix

Video Solution by The Learning Royal

<https://youtu.be/AWjOeBFyeb4>

See Also

2021 AMC 10A (Problems • Answer Key • Resources (http://www.artofproblemsolving.com/community/c133))	
Preceded by Problem 5	Followed by Problem 7
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