1

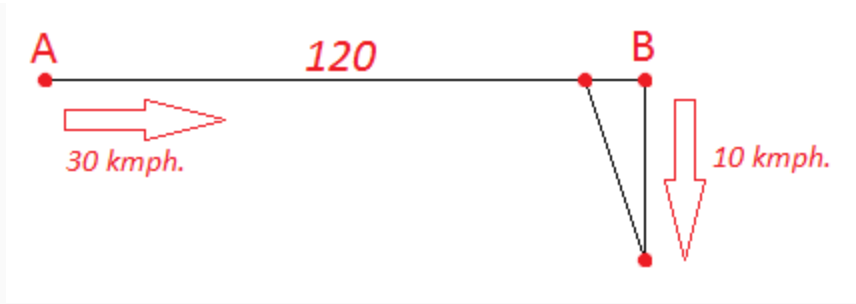
Given:
A can beat B by 20 yards,
A can beat C by 28 yards,
B can beat C by 10 yards,

So, when A is on the finish line B is 20 yards back and C is 28 yards back.

Hence, 20 yards before the finish line C is 8 yards ahead of B, and since the final difference between B and C is 10 yards, then B gains 2 yards every 20 yard. To gain the final difference of 10=2*5 yards B should run total of 20*5=100 yards.

Answer: C.

2



The distance between two motorcyclists would be the length of the hypotenuse, which is square root of $(120-30x)^2+(10x)^2=1000x^2-60*120x+120^2$ (where x is the time in hours) . So we need to minimize the value of quadratic expression (function) $1000x^2-60*120x+120^2$.

Now quadratic function $f(x)=ax^2+bx+c$ reaches its minimum (or maximum when a is negative - not our case), when $x=-\frac{b}{2a}=\frac{60*120}{2*1000}=3.6$

Answer: D.

3

ALGEBRAIC APPROACH:

As on the second day the hiker walked 2 hours longer than he walked on the first day and spent a total of 18 hours walking then t+(t+2)=18 --> t=8. So the hiker walked 8 hours on the first day and 10 hours on the second day;

Let the rate on the first day be r then: 8r+10(r+1)=64 --> r=3.

Answer: B.

10 SECOND APPROACH:

Average rate of the hiker is (total distance)/(total time)=64/18=~3.6, now r<3.6<r+1 (the weighted average of 2 individual averages, r and r+1, must lie between these individual averages) --> only answer choice B fits.

Answer: B.