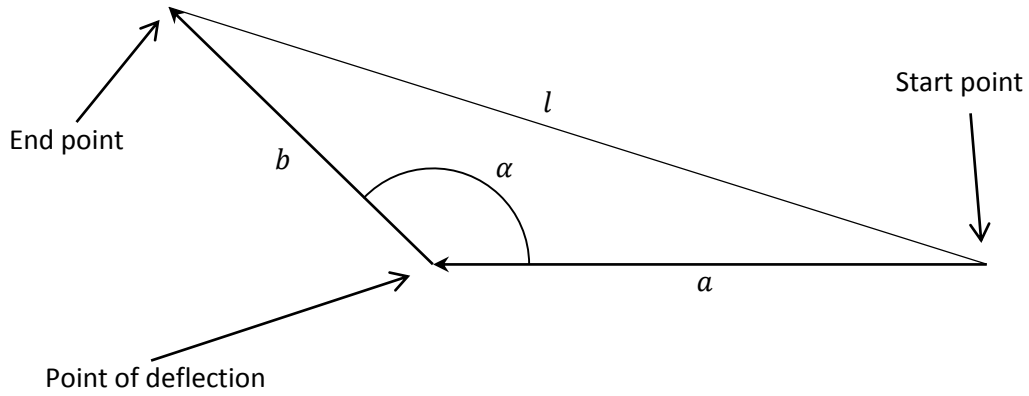
Answer on Question #51336 - Math - Vector Calculus

In a cricket match a batsman hits the ball and a fielder, $a = 30\text{m}$ away, fails to stop the ball but deflects it and slows it down. The ball comes to rest $b = 20\text{m}$ from where the fielder deflected it. Find the distance l from where the ball was hit to where it came to rest. (Angle between a and b is $\alpha = 110°$)

Solution:



According to the law of cosines,

$$l^2 = a^2 + b^2 - 2ab\cos\alpha$$

$$l = \sqrt{a^2 + b^2 - 2ab\cos\alpha} = \sqrt{900\text{m}^2 + 400\text{m}^2 - 1200\text{m}^2\cos 110°} = 41.36\text{m}$$

Answer: $l = \sqrt{a^2 + b^2 - 2ab\cos\alpha} = 41.36\text{m}.$