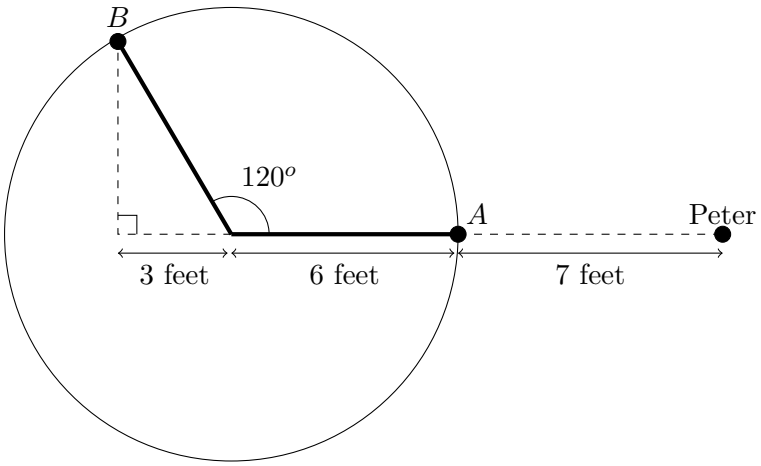
6. [15 points] At the park, Prem is riding on a merry-go-round of radius 6 feet spinning at a constant speed, and Peter is watching, 7 feet away from the merry-go-round. Prem starts at the point A and after 1.5 seconds he's at the point B. The situation is depicted below. The motion of the merry-go-round is counter-clockwise.



a. [2 points] How long does it take for the merry-go-round to complete one revolution?

It takes the merry-go-round $\underline{\quad 4.5 \quad}$ seconds to complete one revolution.

b. [2 points] How far did Prem travel along the circumference of the merry-go-round between point A and point B? Give your answer in exact form.

Prem traveled $\underline{\quad 6(\frac{2\pi}{3}) \quad}$ feet between point A and point B.

c. [2 points] By how many **radians** does the merry-go-round rotate in 3 seconds? Give your answer in exact form.

The merry-go-round rotates $\underline{\quad \frac{4\pi}{3} \quad}$ radians in 3 seconds.

d. [3 points] Find the distance between Peter and the point B.

The distance between Peter and the point B is $\underline{\quad \sqrt{283} \quad}$ feet.

e. [6 points] Find a function $D(\theta)$ that gives the distance in feet between Prem and Peter after Prem has rotated θ degrees from the point A.

$D(\theta) = \underline{\quad \sqrt{(13 - 6\cos(\theta))^2 + (6\sin(\theta))^2} \quad}$.