Quiz 1

Name: _____

Lena the lioness is standing 3000 feet west and 1500 feet north of the center of a circular lake with radius 2000 feet. An antelope is standing at the easternmost point on the shore of the lake.

(i) Draw a picture and impose a coordinate system. Clearly mark the coordinates of the **center of the lake**, **Lena** and the **antelope**.

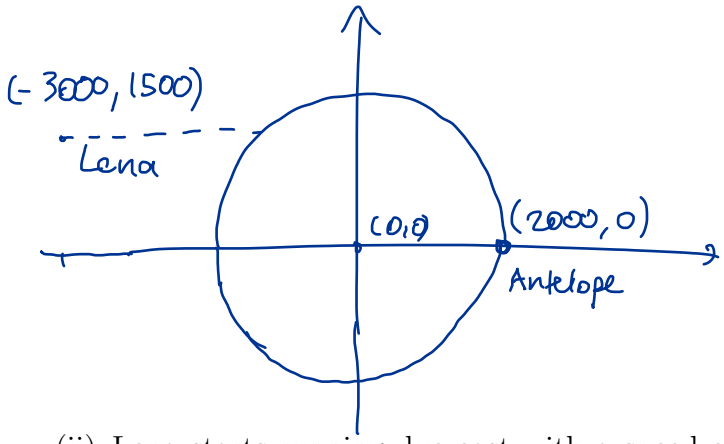

Figure 1: Lena

(ii) Lena starts running due east with a speed of 10 feet/sec. How many minutes does it take her to reach the shore of the lake?

Find x coordinate of the point on the lake.

$y = 1500$

$x^2 + y^2 = 2000^2$ $\Rightarrow x^2 = 2000^2 - 1500^2$

$\Rightarrow x = \pm\sqrt{2000^2 - 1500^2}$

$= \pm\sqrt{4000000 - 2250000}$

$= \pm\sqrt{1,750,000} = \pm 1,322.87$

keep the (-): $x = -1322.87$

dist: $-1322.87 - (-3000) = 1,677.13$ ft

time $= \frac{\text{dist}}{\text{speed}} = \frac{1677.13 \text{ ft}}{10 \text{ ft/sec}} = 167.713 \text{ sec} = 2.8 \text{ min}$

(iii) What is the distance in feet between Lena and the antelope at the moment when Lena reaches the shore of the lake?

Coordinates of Lena on the shore: $(-1322.87, 1500)$

antelope: $(2000, 0)$

dist: $\sqrt{(2000-(-1322.87))^2 + 1500^2} = 3.645.7$ ft