1. Solving \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) for \( y \), we get

\[
y = b \sqrt{1 - \frac{x^2}{a^2}}.
\]

Integrating \( y \) from 0 to 2 will give the area of the ellipse in first quadrant. So desired area is

\[
4 \int_0^a b \sqrt{1 + \frac{x^2}{a^2}} \, dx = 4 \int_0^{\pi/2} ab \sqrt{1 - \sin^2 \theta \cos \theta} \, d\theta \quad \text{(put} \ x = a \sin \theta) \]

\[
= 4ab \int_0^{\pi/2} \cos^2 \theta \, d\theta
\]

\[
= 4ab \left[ \frac{\theta}{2} + \frac{\sin 2\theta}{4} \right]_0^{\pi/2} = \pi ab
\]

2. For first 5 seconds they have traveled 25 meters, and after they ran out of fuel the distance they traveled is,

\[
\int_0^5 5e^{-0.2t} \, dt = \lim_{b \to \infty} \int_0^b 5e^{-0.2t} \, dt = \lim_{b \to \infty} \left[ \frac{5}{-0.2} e^{-0.2t} \right]_0^b
\]

\[
= \lim_{b \to \infty} 25 - 25e^{-0.2b} = 25.
\]

The total distance traveled is 25m + 25m = 50m.