The atmospheric pressure P in pounds per square inch (psi) is given by

P= 14.7 e on top -0.21a
where a is the altitude above sea level (in miles). If a city has an
atmospheric pressure of 13.35 psi, what is its altitude? (Recall that mi=
5,280 ft. Round your answer to the nearest foot.)

Solution:

$P = 14.7e^{-0.21a}$, where a is the altitude above sea level (in miles).

Given P = 13.35, so

$$13.35 = 14.7e^{-0.21a}$$

Dividing both sides on 14.7 obtain

$$e^{-0.21a} = \frac{13.35}{14.7}$$

Using definition of a logarithm

$y = \ln x$ means that $x = e^y$, so

$$-0.21a = \ln\frac{13.35}{14.7} = -0.09633$$

$$a = \frac{-0.09633}{-0,21} = 0.4587 \, ml$$

1ml = 5,280 ft, so

$$a = 0.4587 \times 5,280 = 2,422 \, ft$$

Answer: 2,422 ft