

### Answer on Question#43295 – Math – Algebra

The atmospheric pressure  $P$  in pounds per square inch (psi) is given by  $P = 14.7 e^{-0.21a}$ , where  $a$  is the altitude above sea level (in miles). If a city has an atmospheric pressure of 12.11 psi, what is its altitude? (Recall that 1 mi = 5,280 ft. Round your answer to the nearest foot.)

**Solution:**

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

Given:  $P = 12.11$

$$12.11 = 14.7 e^{-0.21a}$$

Dividing both side on 14.7

$$e^{-0.21a} = \frac{12.11}{14.7}$$

$$\ln e^{-0.21a} = \ln\left(\frac{12.11}{14.7}\right)$$

$$-0.21a \ln e = \ln\left(\frac{12.11}{14.7}\right)$$

$$-0.21a = \ln\left(\frac{12.11}{14.7}\right)$$

$$a = \frac{\ln\left(\frac{12.11}{14.7}\right)}{-0.21} \text{ miles} = 5,280 \frac{\ln\left(\frac{12.11}{14.7}\right)}{-0.21} \text{ feet} = 4,873 \text{ feet}$$

**Answer:** The altitude is 4,873 feet.