

Sec 4.4.4
Applications

Medical research indicates that the risk of having a car accident increases exponentially as the concentration of alcohol in the blood increases. The risk is modeled by $R = 6e^{12.77x}$ where x is the blood alcohol concentration and R , given as a percent, is the risk of having a car accident. What BAC corresponds to a 17% risk of a car accident?

$$R = 6e^{12.77x}$$

$$17 = 6e^{12.77x}$$

$$2.83 = e^{12.77x}$$

$$\ln 2.83 = \ln e^{12.77x}$$
$$\ln 2.83 = 12.77x$$

$$0.081 \approx x$$
$$0.082$$

How long will it take \$25,000 to grow to \$500,000 at 9% annual interest compounded monthly?

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$\frac{500,000}{25,000} = 25,000 \left(1 + \frac{.09}{12}\right)^{12t}$$

$$20 = (1.0075)^{12t}$$

$$\ln 20 = \ln 1.0075^{12t}$$

$$\ln 20 = 12t \ln 1.0075$$

$$12 \ln 1.0075 t \approx 33.4 \text{ years}$$

divide both sides by these to isolate "t".

The percentage of adult height attained by a boy who is x years old is modeled by $f(x) = 29 + 48.8 \log(x+1)$ where x represents the boy's age (5-15) and $f(x)$ represents the percentage of adult height. At what age, rounded to the nearest year, has a boy attained 85% of his adult height?

$$85 = 29 + 48.8 \log(x+1)$$

$$56 = 48.8 \log(x+1)$$

$$1.147 = \log(x+1)$$

$$10^{1.147} = x+1$$

$$13 \text{ yrs.} \approx x$$

Suggested Practice
Sec 4.4, pgs 490-491



103, 105
(disregard graph question), 107,
111,
115ab (disregard graph question)

103. a. 37.3 million
b. 2017

105. 118 feet

107. 8.2 years

111. 8.7 years

115a. 17%
b. 2016

