

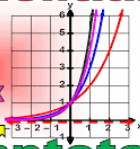
$\log_a x = y$
 $a^y = x$

Unit 2

Exponents and Logarithms

Exponential

$y=2^x$
 $y=3^x$
 $y=4^x$



Asymptote

2.9 Solving Word Problems Without Graphing

Recall:

Growth/Decay Formula

$$y = ab^{\frac{t}{P}}$$

- a = initial amount
- b = rate of change
- t = time passed
- P = time to multiply(period)
- y = future amount

$e = 2.71828\dots$

$\log_e = \ln$



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Unit 2

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Exponential

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Asymptote

Ex.) A sample of radioactive material has a half-life of 2.8 hours and the sample decreases to 7.3 g in 36 h. What is the initial amount? P

$$y = ab^{\frac{t}{P}}$$

$$7.3 = a \left(\frac{1}{2}\right)^{\frac{36}{2.8}}$$

$$7.3 = a(1.35\dots \times 10^{-4})$$

$$a = 54 \text{ kg}$$

$$= \boxed{54163 \text{ g}}$$

$\log_a x = y$
 $a^y = x$

Exponential
 $y=2^x$
 $y=3^x$
 $y=4^x$
Asymptote

Ex.) The population of Canada in 1990 was 26.6 million. The annual growth rate is 1.9% per annum. When will the population reach 40 million?

$1 + 0.019 = P = 1$ y

$b = 1.019$

$y = ab^{t/p}$

$\frac{40}{26.6} = \frac{26.6(1.019)^t}{26.6}$

$\frac{40}{26.6} = 1.019^t$

$\log\left(\frac{40}{26.6}\right) = \log 1.019^t$ $\log_{1.019}\left(\frac{40}{26.6}\right) = t$

$\frac{\log\left(\frac{40}{26.6}\right)}{\log 1.019} = \frac{t \log 1.019}{\log 1.019}$

$t = 22$ years later

1990
 + 22
2012