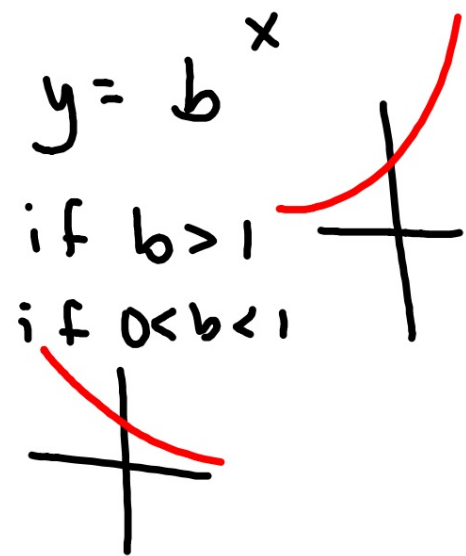


Precalc 11.1

Graph exponential functions and inequalities

Solve problems involving exponential growth and decay



exponent

base

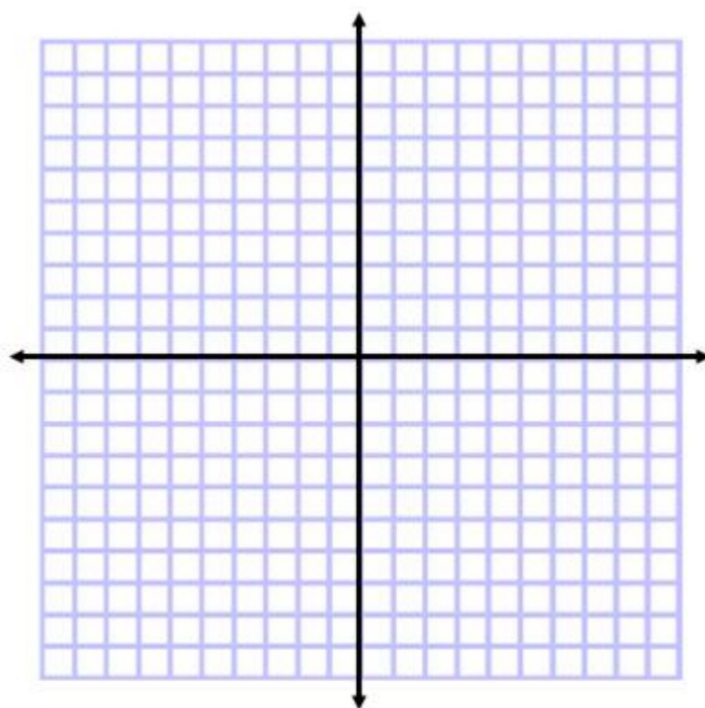
exponential change

A_0 , N_0 , etc.

naught initial

- 1 a. Graph the exponential functions $y = 4^x$, $y = 4^x + 2$, and $y = 4^x - 3$ on the same set of axes. Compare and contrast the graphs.

Same diff.



Exponential
Growth or
Decay

The equation $N = N_0(1 + r)^t$, where N is the final amount, N_0 is the initial amount, r is the rate of growth or decay per time period, and t is the number of time periods, is used for modeling exponential growth or decay.

2 PHYSICS According to Newton's Law of Cooling, the difference between the temperature of an object and its surroundings decreases in time exponentially. Suppose a certain cup of coffee is 95°C and it is in a room that is 20°C . The cooling for this particular cup can be modeled by the equation $y = 75(0.875)^t$ where y is the temperature difference and t is time in minutes.

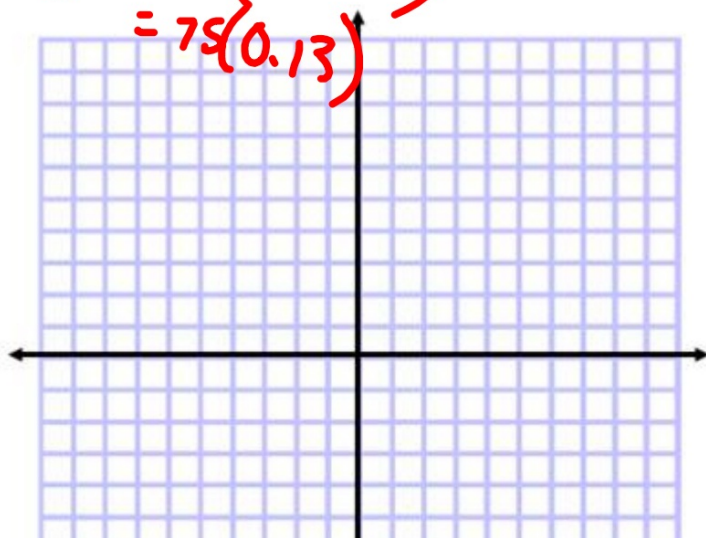
- Find the temperature of the coffee after 15 minutes.
- Graph the cooling function.

$$y = 75(0.875)^{15}$$

$$= 75(0.13)$$

10.12

$$\frac{95 - 20}{85}$$



**Compound
Interest**

The compound interest equation is $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where P is the principal or initial investment, A is the final amount of the investment, r is the annual interest rate, n is the number of times interest is paid, or compounded each year, and t is the number of years.

- 4 **FINANCE** Determine the amount of money in a money market account providing an annual rate of 5% compounded daily if Marcus invested \$200 and left it in the account for 18 months.

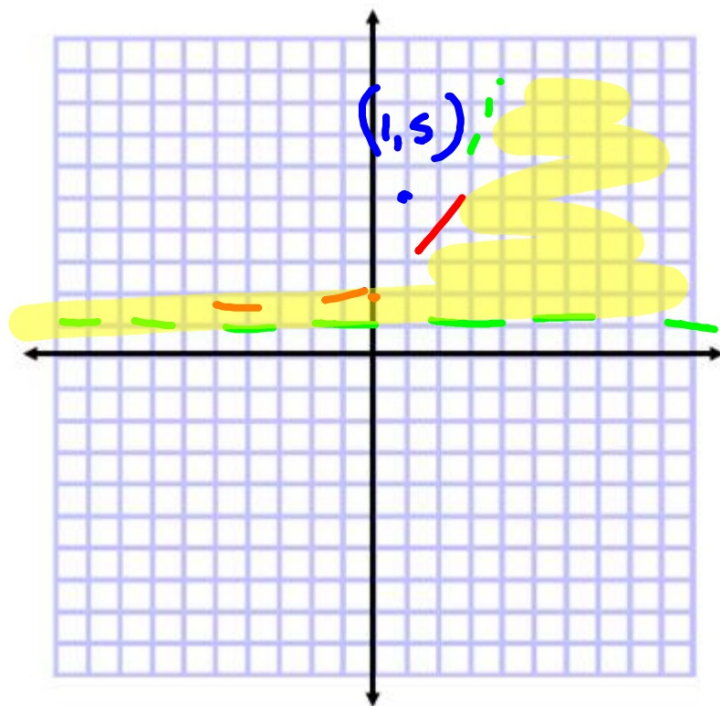
18 mo.

1.5

$$A = 200 \left(1 + \frac{0.05}{365} \right)^{365 \cdot 1.5}$$

5 Graph $y < 2^x + 1$
 $5 < 3$
 $y = 2^x + 1$

$< > - - -$
 $\leq \geq \text{—}$

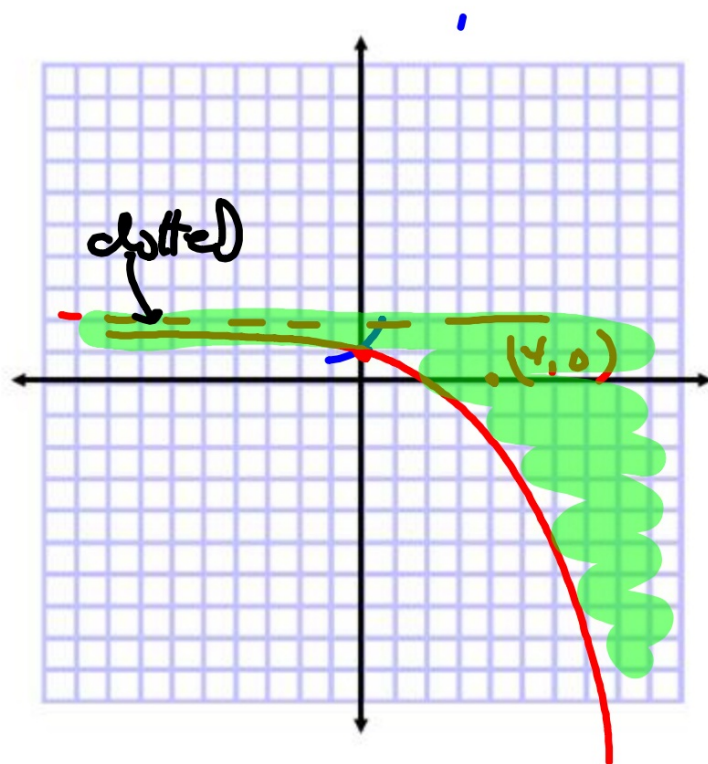


15. $y > -4^x + 2$

$0 > -4^x + 2$

$y = -(4^x) + 2$

$0 > t - 2 \leq 4$



17. $y \leq \left(\frac{1}{2}\right)^x$

$0 \leq \left(\frac{1}{2}\right)^0$

$0 \leq 1$

