

9.1 Exponential Functions

$$f(x) = a^x$$

where a is a constant, and x is a variable.

Ex: Evaluate $f(x) = 10(2)^x$ for:

$$x=1 : 10(2)^1 = 10 \cdot 2 = 20$$

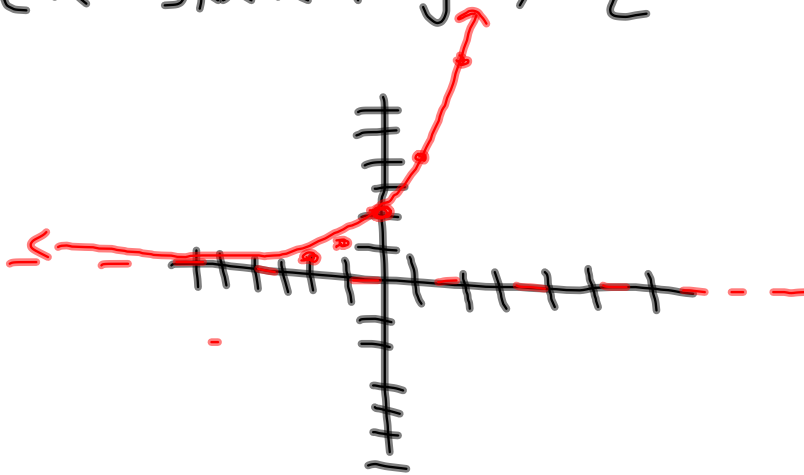
$$x=3.2 : 10(2)^{3.2} = 10 \cdot 9.18 = 91.8$$

$$x=-4 : 10(2)^{-4} = 10 \cdot \frac{1}{16} = \frac{5}{8}$$

Graphing

1. Identify any intercepts
2. Need 5 points to make the "curve"
3. Identify any horizontal asymptotes

Ex: Sketch $g(x) = 2^{x+1}$

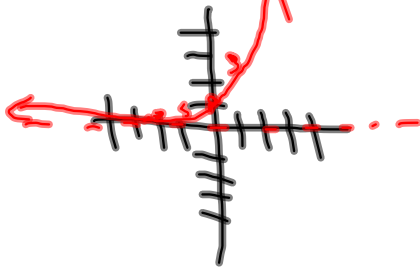


The natural exponential function

e - natural base = 2.71

$$f(x) = e^x$$

Ex: Sketch $f(x) = e^x$



Compound Interest:

After t years, the balance, A ,
in an account with Principal, P ,
and annual interest rate, r , is given by

1. for n compoundings per year: $A = P \left(1 + \frac{r}{n} \right)^{nt}$
2. for continuous compounding: $P e^{rt}$

A total of \$15,000 is invested at a rate of 8%. Find the balance after 6 years if compounded a) monthly b) continuously

$$\begin{aligned} \text{a) } A &= P \left(1 + \frac{r}{n}\right)^{nt} \\ A &= 15,000 \left(1 + \frac{.08}{12}\right)^{12(6)} \\ &= 15,000 (1.006)^{72} \\ &= 15,000 (1.53) \\ &= \boxed{\$23,075.22} \end{aligned}$$

$$\begin{aligned} \text{b) } A &= P e^{rt} \\ A &= 15,000 \cdot e^{(.08)(6)} \\ &= 15,000 \cdot e^{.48} \\ &= \$24,241.12 \end{aligned}$$

Hw:

p. 591

2-84 even

skip 26-44