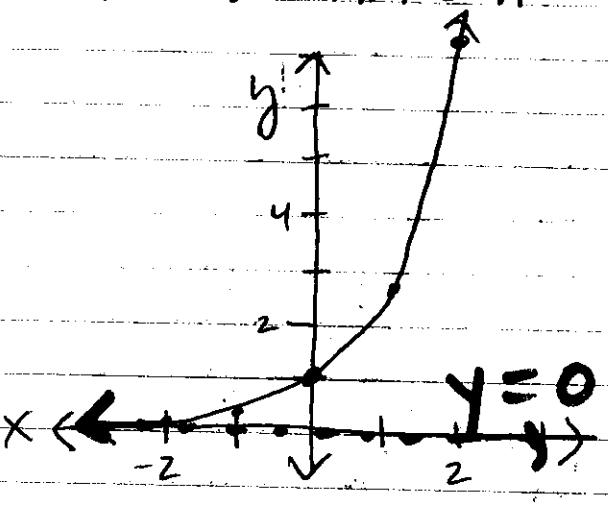
Day 85

8.2/8.3

Base "e" $\approx$ 2.71828
irrational # like π

Graph $y = e^x$

x	y
-2	.14 e^{-2}
-1	.37 e^{-1}
0	1 $= e^0$
1	2.718 $= e^1$
2	7.39 e^2



Evaluate.

a) $e^4 = 54.5982$ 2nd LN e^(4)

b.) $e^{-3} = .0498$ c) $e^{\frac{1}{2}} = 1.6487$

Continuously Compounded Interest

$A = Pe^{rt}$

A: amount
P: principal (deposited)
r = interest rate as a decimal
t = time

(ex) you invest $1300 at an annual interest rate of 4.3% compounded continuously. Find the amount after 3 years.

P

$A = 1300e^{(.043*3)}$

$1479.00

(ex) Pricipal $100, rate 2.8%
how much in 10 years?

$A = 100e^{\wedge}(.028*10)$

$A = \$132.31$

$2^2 = 4$
$2^x = 6$
$2^3 = 8$

Base of power

Logarithms are the inverse of exponential eqs.

$\log_2 6 = x$

calculator: $\log(6)/\log(2)$

Base of log

$x \approx 2.585$

write in logarithmic form.

(1) $729 = 3^6 \rightarrow \log_3 729 = 6$

$3^6 = 729$

(2) $\left(\frac{1}{2}\right)^3 = \frac{1}{8} \rightarrow \log_{\frac{1}{2}}\left(\frac{1}{8}\right) = 3$

write in exponential form

(3) $\log_{10} 1 = 0 \rightarrow 1 = 10^0$

or $10^0 = 1$

④ $\log_2 8192 = 13 \rightarrow 8192 = 2^{13}$

Evaluate. (w/o a calculator)

⑤ $\log_9 27$ set it = to x, then put in exponential form.

$\log_9 27 = x$

$9^x = 27$

$3^2 \quad 3^3$

$(3^2)^x = 3^3$

$3^{2x} = 3^3$

get the bases the same - then set the exponents = to eachother

$\frac{2x}{2} = \frac{3}{2}$

$x = \frac{3}{2}$

check: $9^{3/2} = (\sqrt{9})^3 = 3^3 = 27$

⑥ $\log_{10} 100 = x$

$10^x = 100$

$10 \quad 10^2$

$10^x = 10^2$

$x = 2$

⑦ $\log_3 81 = x$

$3^x = 81$

$9 \quad 9$

$3 \; 3 \; 3 \; 3$

$3^x = 3^4$

$x = 4$

(8) $\log_{64} \frac{1}{32} = x$

← Fraction

negative answer

$64^x = \frac{1}{32}$

$64 = 8 \cdot 8$, $8 = 4 \cdot 2$, $4 = 2 \cdot 2$

$32 = 8 \cdot 4$, $8 = 4 \cdot 2$, $4 = 2 \cdot 2$

$2^{6x} = \frac{1}{2^5}$

$2^{6x} = 2^{-5}$

$\frac{6x}{6} = \frac{-5}{6}$

$x = -\frac{5}{6}$

Classwork:

p. 442 (18-26 Even)

p. 450

(6-24 even, 54, 56)

WORK 24, 26 1st pg.

14-24 WORK