



Present

The Dangerous World of Pre-Calculus (Part 2)

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I) Exponential Functions

A. Evaluating Exponential Functions

1. evaluation
2. using the calculator
3. a real-life exponential function
4. easy exponent FACTS
 - a) zero exponent FACT
 - b) negative exponent FACT
 - c) fractional exponent FACT
5. square root refreshaaaa
6. common errors

B. Rules of Exponents

1. adding exponents rule
2. power of a product rule
3. multiplying exponents rule
4. subtracting exponents rule
5. power of a quotient rule
6. recap of exponents FACTS
7. changing the appearance of exponentials
8. imposter rules

C. Applications of Exponents

1. compound interest
2. nuclear radiation

D. Graphs of Exponential Functions

E. The Irrational Number e

1. the goods on e
2. standard form for base e exponential function
3. continuously compounded interest

II. Logarithmic Functions

A. Logs and Log Graphs

1. inverse of exponentials
2. logs on the calculator
3. log graphs

B. Logs-N-Exponents

1. standard form
2. changing a log to an exponent

C. Log Base 10 and Log Base e

1. common log
2. natural log – base e

D. Log Rules and Properties

1. sweet easy rule: $\log_a b = 1$
2. sum of logs property
3. difference of logs property
4. log of exponents property

E. Uses for Logs

1. simplifying logs
2. solving equations with logs
3. extraneous roots

F. Solving Exponential Equations with Logs

1. easy ones (calculator)
2. Gums

G. Warning – non-rules for Logs

G. Converting Logs to Base 10 or Base e

1. finding values for any log with base 10
2. finding values for any log with base e
3. converting any base to base e

H. Putting Exponential Equations in Terms of e

Other titles available from *The Standard Deviants*:

Algebra *Part 1*
Algebra *Part 2*
Microeconomics
Macroeconomics
Statistics *Part 1*
Statistics *Part 2*
Statistics *Part 3*
Calculus *Part 1*
Calculus *Part 2*
Physics
Biology
Pre-Calculus *Part 1*
Pre-Calculus *Part 2*
Chemistry *Part 1*
Chemistry *Part 2*
Chemistry *Part 3*
Psychology
Finance *Part 1*
Finance *Part 2*
Finance *Part 3*
Accounting *Part 1*
Accounting *Part 2*
Geology *Part 1*

Geology *Part 2*
Basic Math
Trigonometry *Part 1*
Trigonometry *Part 2*
Organic Chemistry *Part 1*
Organic Chemistry *Part 2*
Organic Chemistry *Part 3*
Astronomy *Part 1*
Astronomy *Part 2*
Anatomy *Part 1*
Anatomy *Part 2*
Business Law
English Composition
Spanish *Part 1*
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I.**e:**

$$e = 2.71828182\dots$$

base e exponential function standard form:

$$A(t) = A_0 e^{kt}$$

 A_0 = starting amount

k = constant

t = time

continuously compounded interest:

$$A(t) = Pe^{rt}$$

r = annual percentage rate

t = time in years

P = principal

logarithmic function:

$$f(x) = \log_b x$$

 \log_b is inverse of b^x

$$y = \log_2 8 \quad 2^y = 8$$

2 is the base

y is the exponent, so $y = 3$ **natural log:**

ln or base e

common log:

log or base 10

sweet easy log rule:

$$\log_b b = 1$$

$$\log_3 3 = 1$$

$$\ln e = 1$$

$$\log 10 = 1$$

sum of logs property:

$$\log_b mn = \log_b m + \log_b n$$

$$\log 30 = \log (10 \cdot 3) = \log 10 + \log 3$$

difference of logs property:

$$\log_b \frac{m}{n} = \log_b m - \log_b n$$

$$\log (.04) = \log \frac{4}{100} = \log 4 - \log 100$$

log of exponents property:

$$\log_b m^n = n(\log_b m)$$

$$\log (10^x) = x \log 10 = x$$

II. FORMULAS**exponents:**

$$x^3 = x \cdot x \cdot x$$

exponential function standard form:

$$f(x) = b^x$$

$$b > 0$$

Bacteria growing exponential formula:

$$B(t) = 100(1.12)^t$$

t = time

zero exponent FACT:

$$b^0 = 1$$

negative exponent FACT:

$$b^x = \frac{1}{b^{-x}}$$

fractional exponent FACT:

$$b^{\frac{1}{x}} = \sqrt[x]{b} \quad b^{m/n} = (\sqrt[n]{b})^m$$

adding exponents rule:

$$a^m \cdot a^n = a^{m+n}$$

power of a product rule:

$$(ab)^n = a^n \cdot b^n$$

multiplying exponents rule:

$$(a^m)^n = a^{m \cdot n}$$

subtracting exponents rule:

$$a^m / a^n = a^{m-n}$$

power of a quotient rule:

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

compound interest formula:

$$A(t) = P(1+r/n)^{nt}$$

P = principal

n = # of interest payments per year

r = annual interest rate as decimal

t = # of years

half-life formula:

$$A(t) = A_0 \left(\frac{1}{2}\right)^{t/h}$$

 A_0 = starting amount of substance

t = time

h = half-life

y-intercept for exponential functions:

$$y = Ab^x, A = y\text{-intercept}$$