Alg 3 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

WS Assessment

Target 10:

LOGARITHM function

**I can:**

* Use rules of logarithm to manipulate given expression
* Convert between exponential and logarithmic forms of equation
* Use change base formula to solve exponential equation.
* **Unit 4: Logarithms & Exponentials**
* **C**[**CSS.MATH.CONTENT.HSF.LE.A.4**](http://www.corestandards.org/Math/Content/HSF/LE/A/4/): For exponential models, express as a logarithm the solution to *abct* = *d* where *a*, *c*, and *d*are
* [**CCSS.MATH.CONTENT.HSF.IF.C.8.B**](http://www.corestandards.org/Math/Content/HSF/IF/C/8/b/): Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)ᵗ, y = (0.97)ᵗ, y = (1.01)12ᵗ, y = (1.2)ᵗ/10, and classify them as representing exponential growth or decay.
* [**CCSS.MATH.CONTENT.HSF.BF.A.1**](http://www.corestandards.org/Math/Content/HSF/BF/A/1/): Write a function that describes a relationship between two quantities.\*
* [**CCSS.MATH.CONTENT.HSF.BF.A.1.A**](http://www.corestandards.org/Math/Content/HSF/BF/A/1/a/): Determine an explicit expression, a recursive process, or steps for calculation from a context.
* [**CCSS.MATH.CONTENT.HSF.BF.A.1.B**](http://www.corestandards.org/Math/Content/HSF/BF/A/1/b/): Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model*.
* [**CCSS.MATH.CONTENT.HSA.SSE.A.1.B**](http://www.corestandards.org/Math/Content/HSA/SSE/A/1/b/): Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret P(1+r)n as the product of P and a factor not depending on P*.

HW#10 Logarithm – [www.deltamath.com](http://www.deltamath.com)

Exponent and Logarithm - They are inverse each other.

Convert form between exponential and logarithm

Rewrite the following log in exponential format

Rewrite the following exponent in logarithm format

Evaluate log value; Note: No base means base is 10

Direct method:

Change base method: log (64) / log (4) =

You do the following, show me one for **stamp** (both methods)

Solve for x. Hint: rewrite in log format like #2

343x = 7 64x = 4

Now you do. Solve for x, convert to log first

3x = 69 6x = 51 9x = 49

2x = ½

9x + 10 = 81 62x = 27 (5)32x + 1 = 71

Logarithm Properties Four basic properties

1. log*b*(*xy*) = log*bx* + log*by* (product→add) 2. log*b*(*x/y*) = log*bx*- log*by* (dividet→subtract)

3. log*b*(*xn*) = *n* log*bx* (power → multiply) 4. log*bx* = log*ax* / log*ab* (change base formula)

Additional properties

log*b*1 = 0 l log*bb* = 1 log*bb2* = 2 log*bbx* =*x*

*b*log*bx* = *x*  log*ab* = 1/log*ba Calculator LOG means* Log 10  and LN = Loge

**Expanding expression**

log2 (xyz2) = ? log3 (3x) = ? =?

=? =? =?

**Condense expression**

5log3u + 6log3v = ? ln x – 4ln y = ? 4 log3u − 20 log3v =?

2(log 2x − log y) − (log 3 + 2 log 5) =? 3 log x + 2 log y - (1/2) log z =?

Do the following

Condense Expand

)

Given log a -12; log b = 15; and log c = 1. Find the value of

Given log a -5; log b = -11; and log c = 1. Find the value of

Logarithmic Equations

Type 1 (Cancel log both sides)

log (x + 9) = log 4x log (5x) = log (10 – 3x)

log (3m – 1) = log (4m – 6) log (a) – log (4a – 9) = 0

Simplify first

log (x) + log(6) = log (2) log (x) – log (6) = log 15

log(2x) + log (x) = log 32 log (x + 7) + log(x – 3) = log 77

Type 2 (Convert to exponent first)

- 8 + log (x + 1) = - 8 - 2 + log (x – 1) = 2

Exponential equation involve log (Review)

5x = 7 4a = 14 33x = 22 2(x + 2) = 16

1. Find the equation of the exponential function that passes through the points (2, 264) and (6, 4044) and has a horizontal asymptote k = 12 Hint: format y = (a)(bx) + k

Write the exponential function that passes thru the points (2, 16) and (6, 256), asymptote k = 0

3. Write the exponential function that passes thru the points (-1, -2) and (3, -162), no asymptote

Review Check with calculator

Condense

log 5 + log 2 = log 5 – log 2 =

ln 5 + ln 2 = ln 5 – ln 2 =

Expand

log 45 = \_\_\_\_\_ + \_\_\_\_\_\_\_ log 5 = \_\_\_\_\_\_ - \_\_\_\_\_\_\_

Solve 2 + log (1 + x) = log (1 – x2)

**Assessment Target 10**

**I can…** Use properties of exponents and logarithms to simplify or rewrite expressions

Rewrite each expression in the form.

Rewrite each logarithmic equation in **exponential form** using the definition of a logarithm.

Rewrite each exponential equation in **logarithmic form** using the definition of a logarithm**.**

8x = 30 308 = x x8 = 30 30x = 8

Condense / Expand

log 8 – log 4 – log 3 = =

Solve for x

log (x + 2) = log (3x – 4)

log (1 + x) - 5 = log (1 – x2)

Solve for x

2x = 20 2x = 20x -1