# Warm-up

Tuesday, April 14, 2015

1. Write the new equation of $f(x) = x^2$ given the following transformations: reflected over the x axis, left 3 and up 2.

2. Write the new equation of $g(x) = 2^x$ given the following transformations: reflected over the x axis, right 4 and down 3.

3. What is the end behavior for $f(x) = -3x^4 + 9x^3 + 5x + 3$

a.) Up and Up, b.) Up and Down,

c.) Down and Down, d.) Down and Up

10

9

8

7

6

5

4

3

2

1

# 1st Block

FRONT OF ROOM

| | | | | | |
|---|---|---|---|---|---|
| | | Caleb P.(4) | Kacie (Mary B.) (9) | Raul V. (2) | Ariany A. (12) |
| Joanna C. (7) | Casey A. (13) | Treyvon T. (1) | Jazz B. (11) | Jordan J. | Makayla Ch. (5) |
| Micah M. (25) | Daniella A. (14) | Mijanou A. (10) | Melissa C.(22) | Justin B. (8) | Manual F. (21) |
| Courtney S. (24) | Sierra B. | Arthur M.(23) | Kayla H. | Bruce C. (17) | Malik M. (20) |
| | Trya O. (6) | DeAnthony C. (15) | Makayla B. (18) | Tristan W. (3) | Tavion W. (Teyy) (19) |
| Sandra L. (16) | Tia M. | Frida F. | Timothy C. (TJ) | | Leslie P. |

# $3^{rd}$ Block

FRONT OF ROOM

| | | |
|---|---|---|
| | D'Aja J. (16) | Sydney H. (5) |
| Matty A. (17) | Angie L. (22) | Christina K. |
| Peter A. (8) | Fabian C. (1) | Ashaani L. (10) |
| | Alyssa H (19) | Ayuk A.(21) |

| | | |
|---|---|---|
| | Christian W. (13) | Donel D.(11) |
| Devon K. (23) | Katera D. (7) | Sofia P (18) |
| Wesley C (15) | Brenda H (4) | |
| Lauren Y. | Marcos R. (9) | Delia F.(20) |

| | | | | | |
|---|---|---|---|---|---|
| | AnnMarie | Sosa (12) | Leo G. | Thedrin C. | Sabrina W. |
| Abby F. | Brianna R. | Brandon G. (6) | Nam (11) | London C.(3) | Allan H. |

# 4th Block

FRONT OF ROOM

| | | | |
|---|---|---|---|
| Maddie B. | Wesley K. | Diego R. (19) | Kristal E. (9) |
| Johann A. | Haley K. (20) | Cory C. (11) | Shelby H. (14) |
| Kory O. | Phillip B. (17) | Stefon J. (15) | Natasha P. (6) |
| Matt S. | Rebecca J. | Nehemiah M. (8) | America T. |
| | Megan H. | Adrian P. (10) | Karen M. (18) |

| | | |
|---|---|---|
| Cherry T. | Samantha A. | |
| Stukes L. | Gabby J. (16) | Joseph P. |
| Taryn H. | Naomi I. (5) | Quentin K. |
| Josh A. | De'Narius G. (12) | Sean F. |
| Seth M. (7) | Noah D. (1) | Saul T. |

# Homework Review…

Page 7
1. growth, 8000
2. Decay, 20
3. Decay, 15
4. Growth, 6

Page 8
5. 8.81
6. 153,593.30
7. 12,765.15
8. 2,391.48

Page 9
1. 160.10
2. 43,871.99
3. 16,777,216
4. 4
5. 6191, 4%
6. 361,223.09
7. 2.37034368 E-11

Page 10
8. 51.24
9. a)1724.48 b)1686.05 c) 1799.78
10. Hmm, somewhere between 1 and 2
11. a) 2674.38 b) 2654.49 c) 2622.93 d) 2570.99
12. 1: 1419.07, 2: 2013.75
13. 13193.30

## Objectives

Define the relationship between a function and its inverse.

Find the inverse relation of a function.

Convert between Exponential and Logarithmic form.

## Homework

Packet pages 11, all problems.

Packet pages 12-13, all problems.

**QUIZ THURSDAY – Growth and Decay Problems, Inverse Functions**

**in·vert** [*v.* in-**vurt**; *adj., n.* **in**-vurt] ? Show IPA

***verb (used with object)***

1. to turn upside down.
2. to reverse in position, order, direction, or relationship.
3. to turn or change to the opposite or contrary, as in nature, bearing,
4. to turn inward or back upon itself.
5. to turn inside out.

A function and its inverse function can be described as the "DO" and the "UNDO" functions.

**For example**

Square and Square Root Function

$$3^2 = 9, \sqrt{9} = 3$$

Can you think of some we already know about?

**For example**

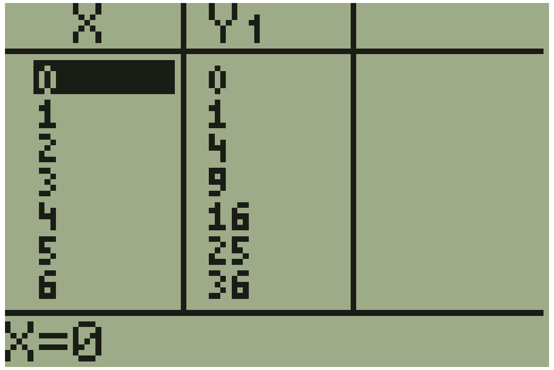
Cube  Root and Cube Function

$$\sqrt[3]{125} = 5, 5^3 = 125$$

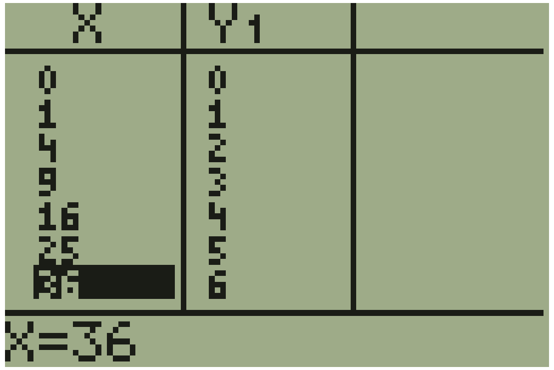
Notice that the order you apply the functions doesn't matter.

## Let’s look at a table of values for a function and it’s inverse…

$f(x) = x^2$




$f(x) = \sqrt{x}$




## What do you notice about their x and y values?

The x and y values are just flipped. This will be true for any function and its inverse.

This also means the domain and range are flipped for a function and its inverse.

# The burning question….

How do we find the equation for an inverse of a function?

# Find the inverse of $y = x^2 - 1$

**Two Steps**

1. **Switch x and y values**
2. **Solve for y**

$$y = x^2 - 1$$

# Find the inverse

7. $y = 3(x + 1)$

13. $y = 6x^2 - 4$

**Two Steps**

1. Switch x and y values
2. Solve for y

# Inverse notation

The inverse of a function $f$ is denoted by $f^{-1}$. You read $f^{-1}$ as "the inverse of $f$" or as "$f$ inverse." The notation $f(x)$ is used for functions, but the relation $f^{-1}$ may not even be a function.

Let $f(x) = 6 - 4x$. Find $f^{-1}(x)$.

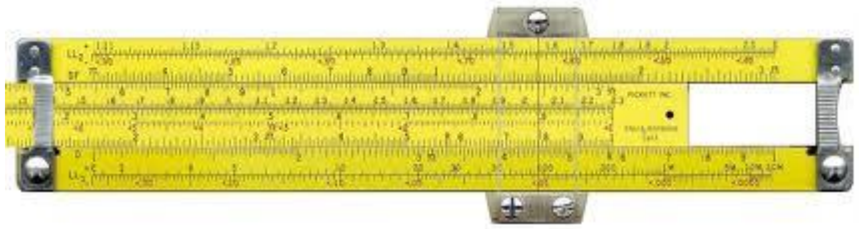
$$f^{-1} = -\frac{x-6}{4}$$

Work on page 11 of your packet.

Do problems 1-6

How will you solve this equation?

$$8192 = 2^x$$



Used to be you had to use one of these.

You're going to use a calculator but you still need to know how logs work.

Things you should know about logarithms…

Logarithms are exponents

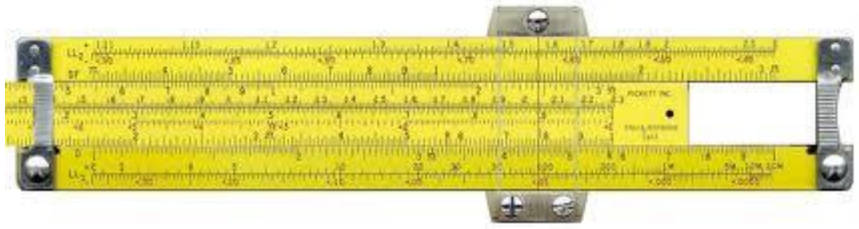
$$\boxed{b^x = y \leftrightarrow log_b y = x}$$

For example…

$$3^4 = 81 \leftrightarrow log_3 81 = 4$$

The log function returns the exponent, 4.

**Logarithms are inverses of Exponential Functions**



$$3^4 = 81 \leftrightarrow log_3 81 = 4$$

Read this as “log base b of x” or log base 3 of 81.

In other words, the logarithm y is the exponent to which b must be raised to get x

or 4 is the power 3 must be raised to get 81.

Convert the following to Log form

Exponential Form $y = b^x$

Log Form $\log_b y = x$

$$16 = 2^4 \qquad \log_2 16 = 4$$

$$9 = 3^2 \qquad \log_3 9 = 2$$

$$1 = 7^0 \qquad \log_7 1 = 0$$

$$2 = 8^{\frac{1}{3}} \qquad \log_8 2 = \frac{1}{3}$$

$$\frac{1}{27} = 3^{-3} \qquad \log_3 \frac{1}{27} = -3$$

We can go the other way!

| Log Form | Exponential Form |
|---|---|
| $\log_b x = y$ | $x = b^y$ |
| $\log_2 32 = 5$ | $32 = 2^5$ |
| $\log_5 25 = 2$ | $25 = 5^2$ |
| $\log_{10} 10 = 1$ | $10 = 10^1$ |
| $\log_{16} 4 = {}^1/_2$ | $4 = 16^{1/2}$ |
| $\log_8 2 = {}^1/_3$ | $2 = 8^{1/3}$ |

Can you find the unknown?

*Hint: rewrite the expression in exponential form.*

$\log_x 25 = 2$ $\quad x^2 = 25$ $\quad x = 5$

$\log_6 x = 2$ $\quad 6^2 = x$ $\quad x = 36$

$\log_8 64 = x$ $\quad 8^x = 64$ $\quad x = 2$

When you are asked to evaluate a log, simply set it equal to a variable, x. Then use the previous procedures to solve. (Put in exponential form.)

| | | | |
|---|---|---|---|
| $\log_4 16$ | $log_4 16 = x$ | $4^x = 16$ | $x = 2$ |
| $\log_{12} 12$ | $log_{12} 12 = x$ | $12^x = 12$ | $x = 1$ |
| $\log_9 1$ | $log_9 1 = x$ | $9^x = 1$ | $x = 0$ |

# But what about this type of problem?

Evaluate $\log_4 32$

# But what about this type of problem?

Evaluate $\log_{32} 2$