

Math 3 Unit 2A Test Review
Inverse and Exponential Functions

Name Kyle
Date _____ Period _____

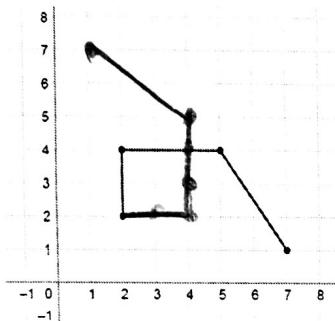
I. Exponential and Logarithm Functions

- A. Graphing, Describing shifts in graphs, Domain and Range
- B. Simplifying logarithms
- C. Writing log functions in exponential form and exponential functions in log form
- D. Solving exponential equations algebraically and graphically

II. Inverses

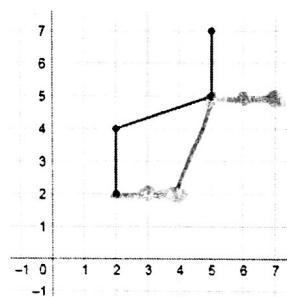
- A. Finding the inverse of a function algebraically (linear, quadratic, exponential, square root, logarithm, $y = x^a$)
- B. Graphing the inverse of a relation (reflection over $y = x$)
- C. Recognizing when an inverse will be a function

1. Sketch the graph of the inverse of the following relation.



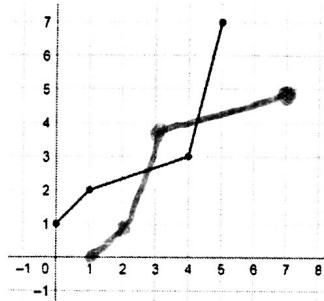
Is the inverse a function? No

2. Sketch the graph of the inverse of the following relation.



Is the inverse a function? Yes

3. Sketch the graph of the inverse of the following relation.



Is the inverse a function? Yes

Match each relation with its inverse.

D 4. $y = 6x - 7$ $\downarrow \begin{matrix} \cdot 6 \\ -7 \end{matrix} \uparrow \begin{matrix} \div 6 \\ +7 \end{matrix}$

A. $y = \frac{x+6}{7}$

B 5. $y = x^3$

B. $y = \sqrt[3]{x}$

C 6. $y = 3^x$

C. $y = \log_3 x$

E 7. $y = 6x^2 - 7$ $\downarrow \begin{matrix} \cdot 6 \\ -7 \end{matrix} \uparrow \begin{matrix} \sqrt{ } \\ +6 \end{matrix}$

D. $y = \frac{x+7}{6}$

A 8. $y = 7x - 6$ $\downarrow \begin{matrix} \cdot 7 \\ -6 \end{matrix} \uparrow \begin{matrix} \div 7 \\ +6 \end{matrix}$

E. $y = \pm \sqrt{\frac{x+7}{6}}$

9. Given $f(x) = (x + 4)^2 - 9$

- Graph $f(x)$.
- Graph $f^{-1}(x)$.
- How does the graph of $f(x)$ relate to the graph of $f^{-1}(x)$?

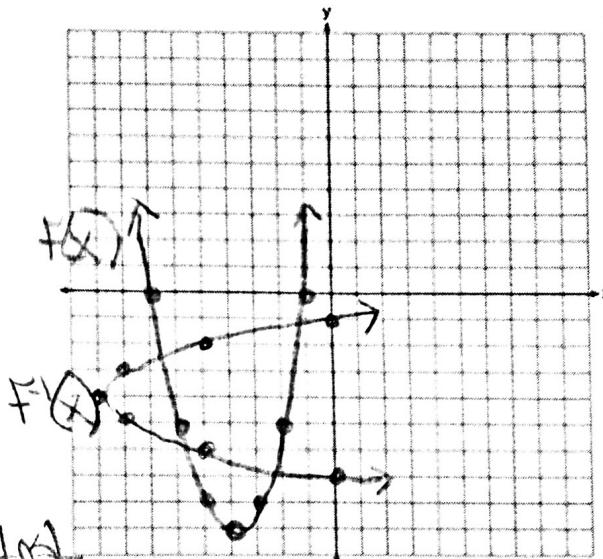
• reflections over the line
 $y = x$
 (switch x 's and y 's)

- Determine if $f(x)$ represents a function.

Yes

- Determine if $f^{-1}(x)$ represents a function.

NO - fails the vertical line test



10. Find the inverse function of $g(x) = 5^x$ and demonstrate the inverse using input-output pairs.

Inverse:

$$g^{-1}(x) = \log_5 x$$

x	5^x
-1	$\frac{1}{5}$
0	1
1	5
2	25
3	125

x	$\log_5 x$
$\frac{1}{5}$	-1
1	0
5	1
25	2
125	3

11. Given $f(x) = 2^{x+3} - 4$

- Graph $f(x) = 2^{x+3} - 4$.
- Describe the transformation from the parent function $g(x) = 2^x$ to $f(x)$.

• translated left 3
 down 4

- Identify the domain and range of $f(x)$.

$$D: (-\infty, \infty) \quad R: (-4, \infty)$$

- Identify the x and y intercept(s) of $f(x)$.

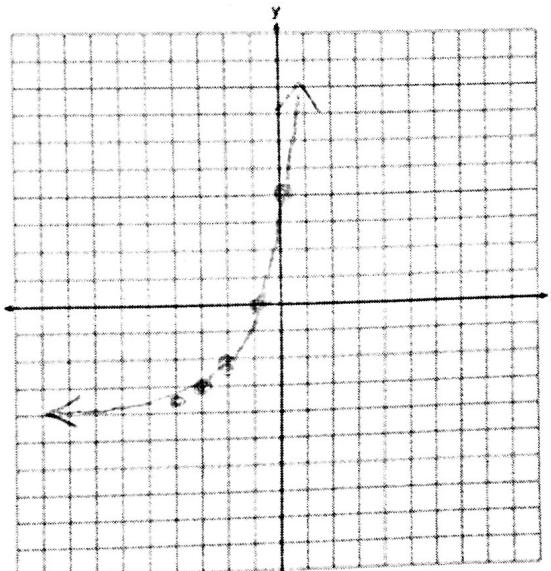
$$x\text{-int: } (-1, 0) \quad y\text{-int: } (0, -4)$$

- Increasing/Decreasing Intervals:

$$\text{Inc: } (-\infty, \infty) \quad \text{Dec: Never}$$

- Determine the domain and range of $f^{-1}(x)$.

$$D: (-4, \infty) \quad R: (-\infty, \infty)$$



12. Rewrite each exponential equation in logarithmic form and each logarithmic function in exponential form.
DO NOT SOLVE.

a. $3^x = 81$

$$\log_3 81 = x$$

b. $4^3 = 64$

$$\log_4 64 = 3$$

c. $\log_2 x = 6$

$$2^6 = x$$

d. $\log_4 16 = x$

$$4^x = 16$$

13. Evaluate the following log expressions.

a. $\log_2 32 = 5$

b. $\log_2 1 = 0$

c. $\log_2 2 = 1$

d. $\log_2 \frac{1}{2} = -1$

e. $\log_2 -2$ DNE
(does not exist)

14. Use technology to solve the following equation. Round to the hundredth place.

$63 = 2 \cdot 5^x$
 $x = 2.14$

Graph $y_1 = 2 \cdot 5^x$

$y_2 = 63$

Find pt. of intersection