Honors Math 3 Unit 2A Test Review

Inverse and Exponential Functions

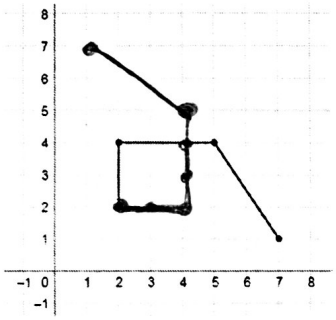
Name Key

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

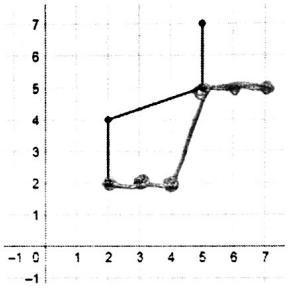
II. Inverses
- A. Finding the inverse of a function algebraically (linear, quadratic, exponential, square root, logarithm, $y = x^a$)
- B. Graphing the inverse of a relation (reflection over $y = x$)
- C. Recognizing when an inverse will be a function

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



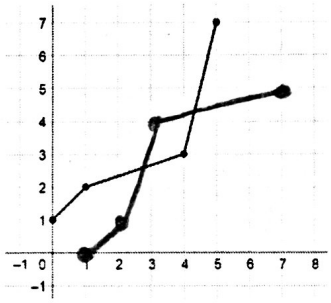
Is the inverse a function? NO

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

If the graph of the inverse in #1-3 did not represent a function, determine how you could limit the domain of the original relation so that the inverse would be a function.

1) The original relation needs to pass the horizontal line test.
∴ Limit the domain to D: [5, 7] or D: [2]

Match each relation with its inverse.

D 4. $y = 6x - 7$ $\downarrow \cdot 6 \; -7$ $\uparrow \div 6 \; +7$

B 5. $y = x^3$

C 6. $y = 3^x$

E 7. $y = 6x^2 - 7$ $\downarrow$ sqr $\cdot 6 \; -7$ $\uparrow \div 6 \; +7$ $\sqrt{}$

A 8. $y = 7x - 6$ $\downarrow \cdot 7 \; -6$ $\uparrow \div 7 \; +6$

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

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

C. $y = \log_3 x$

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

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

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

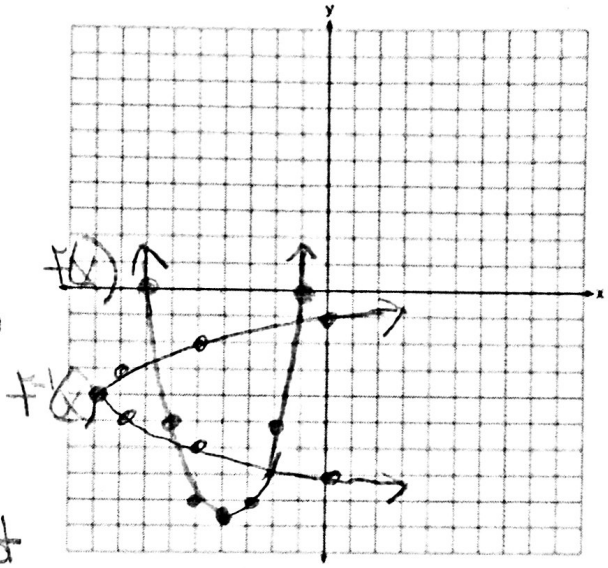
a. Graph $f(x)$. [redacted]

b. Graph $f^{-1}(x)$. [redacted]

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

· reflections over the line $y=x$

(x's and y's switch)



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

Yes

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

No - fails the vertical line test

f. If $f^{-1}(x)$ is not a function, how could you limit the domain of $f(x)$ so that $f^{-1}(x)$ would represent a function?

D: $(-\infty, -4]$ or D: $[-4, \infty)$

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

Inverse:

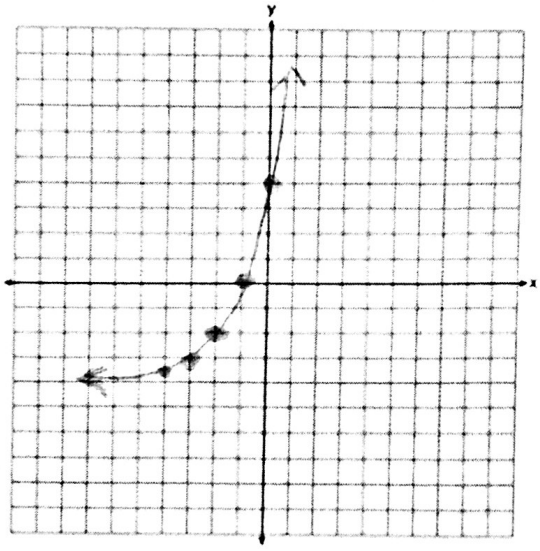
$g^{-1}(x) =$ $\log_5 x$

x	5^x
-1	1/5
0	1
1	5
2	25
3	125

x	$\log_5 x$
1/5	-1
1	0
5	1
25	2
125	3

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

a. Graph $f(x) = 2^{x+3} - 4$.



b. Describe the transformation from the parent function $g(x) = 2^x$ to $f(x)$.

· translated left 3 & down 4

c. Identify the domain and range of f(x).

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

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

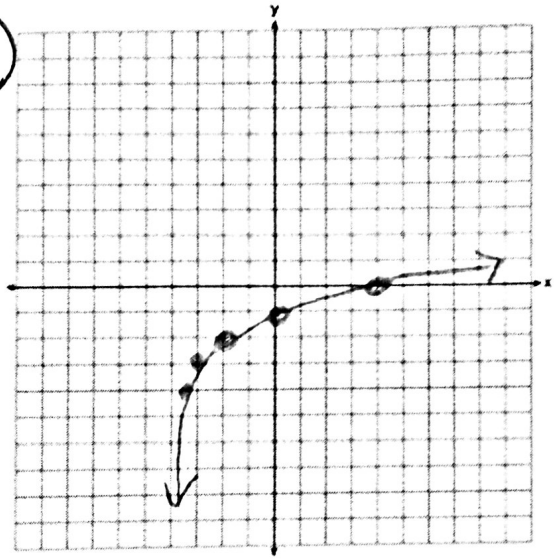
x-int: $(-1, 0)$ y-int: $(0, 4)$

e. Increasing/Decreasing Intervals:

Inc: $(-\infty, \infty)$ Dec: Never

f. Determine the domain and range of $f^{-1}(x)$. D: $(-4, \infty)$ R: $(-\infty, \infty)$

g. Graph $f^{-1}(x)$.



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

a. $3^x = 81$	b. $4^3 = 64$	c. $\log_2 x = 6$	d. $\log_4 16 = x$
$\log_3 81 = x$	$\log_4 64 = 3$	$2^6 = x$	$4^x = 16$

13. Evaluate the following log expressions.

a. $\log_2 32$ = 5	b. $\log_2 1$ = 0	c. . $\log_2 2$ = 1	d. . $\log_2 \frac{1}{8}$ = -3	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