Review

SM3 Test Review 9.1.-9.4

40 pt

Name _____ Date _____ Period Key

Simplify.

1. $\frac{-8x^4}{4\ 20x^5+4} = \frac{-1}{4x^9}$

2. $(2x^3)^5$ $2^5x^{15} = 32x^{15}$

3. $(6x^{-2})(-2x^7)$ $-12x^{-2+7} = -12x^5$

Solve each function by making the bases the same.

4. $2^{3x} = 8$ $2^{3x} = 2^3$ $\frac{3x}{3} = \frac{3}{3}$ $x = 1$

$\frac{5}{3^2}\frac{1}{9} = 3^{x-4}$ $3^{-2} = 3^{x-4}$ $-2 = x-4$ $+4 \quad +4$ $x = 2$

Describe how to transform the graph of the basic function $g(x)$ into the graph of the given function $f(x)$.

6. $g(x) = \ln x;\ f(x) = \ln(-x) - 7$ 2pt each

① Reflect over y axis

② Down 7

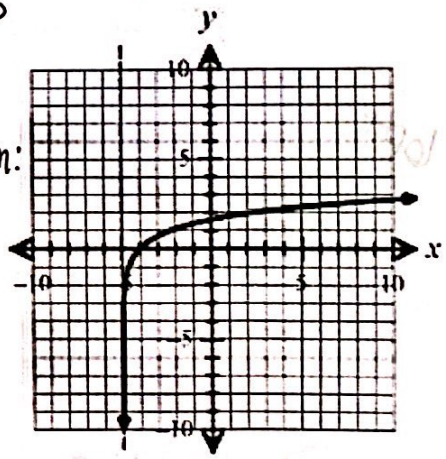
7. $g(x) = 2^x;\ f(x) = 3 \cdot 2^{x+3}$

① vertical stretch of 3

② left 3

8. Determine the function that best describes the given graph.

transformation: left 5



a. $y = \ln x - 5$

b. $y = \ln(x - 5)$

c. $y = \ln x + 5$

d. $y = \ln(x + 5)$

9. Which of the following could represent the graph and its inverse graphed on the same coordinate grid?

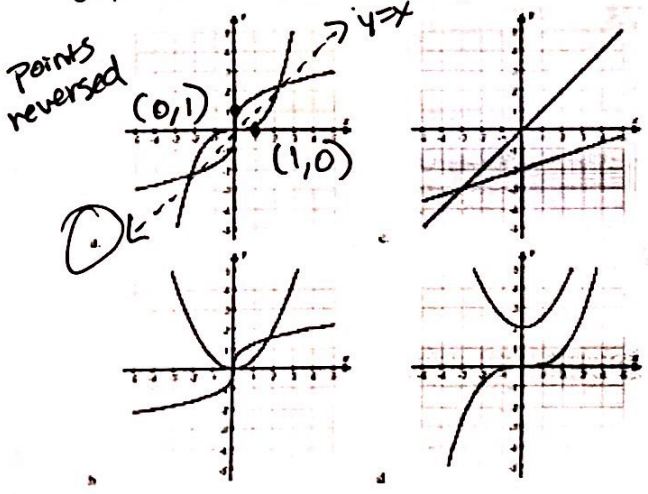
Points reversed

$y = x$

(0,1)

(1,0)

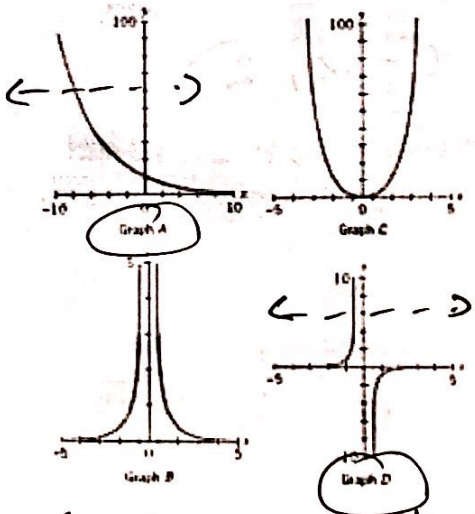
a



Inverses are symmetrical over the line $y = x$

Points are reversed

10. Which of the following graphs have an inverse? Explain Why. 2points



Graphs pass the horizontal line test.

Exponential functions have horizontal asymptotes.

Use the given function f to: so $y =$

(a) Find the domain of f and any asymptotes of f. (b) Write the transformations. (c) Graph f. (d) From the graph determine the range.

Use transformations and a table of values for at least 3 key points to get the graphs. No graphing calculators!

6pt

11. $f(x) = \left(\frac{1}{2}\right)^{x-1}$

a → 1pt

1pt Transformations
① Right 1

Domain: $(-\infty, \infty)$

Asymptote: $y = 0$ 1pt

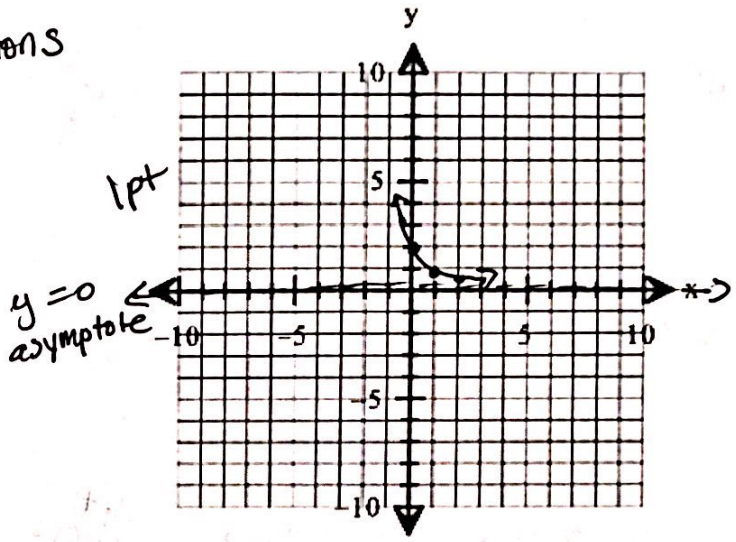
Key points and transformations:

$a = \frac{1}{2}$

x	$f(x)$
-1	2
0	1
1	1/2

1pt

x	$f(x)$
0	2
1	1
2	1/2



Range: $(0, \infty)$ 1pt

6pt

12. $f(x) = -3^x + 2$

a →

1pt Transformations
① Reflect over x axis
② up 2

Domain: $(-\infty, \infty)$ 1pt

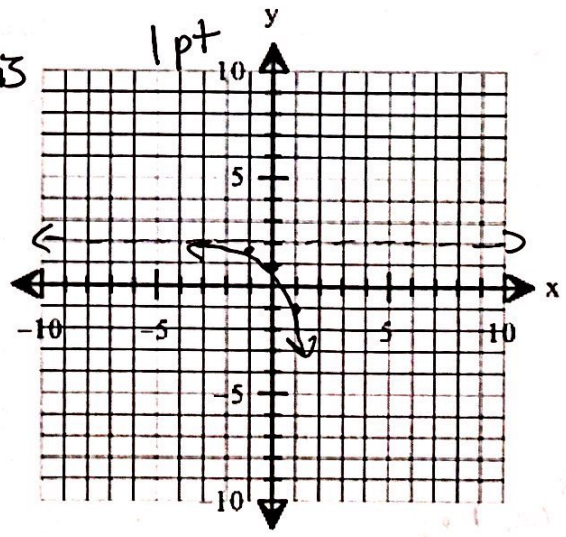
Asymptote: $y = 2$ 1pt

Key points and transformations:

x	$f(x)$	
-1	1/3	•-1 +2
0	1	•-1 +2
1	3	•-1 +2

1pt

x	$f(x)$
-1	1 2/3
0	1
1	-1



Range: $(-\infty, 2)$ 1pt

Logarithmic Functions have vertical asymptotes. so $x=$

6pt 13. $f(x)=\log_2(x)+1$ 1pt Transformations ① up 1

Domain: $x>0$ 1pt $(0,\infty)$

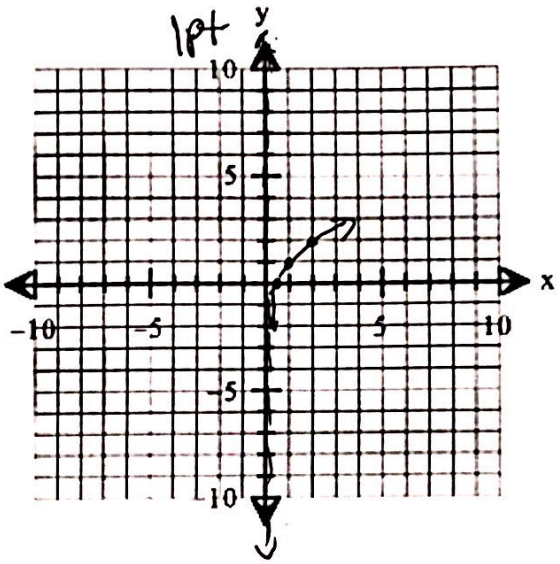
Asymptote: $x=0$ 1pt

Key points and transformations:

x	$f(x)$	
1/2	-1	+1
1	0	+1
2	1	+1

1pt

x	$f(x)$
1/2	0
1	1
2	2



Range: $(-\infty, \infty)$ 1pt

6pt 14. $f(x)=2\log_3(x+1)$ Transformations 1pt ① vertical stretch of 2 ② Left 1

Domain: 1pt $x+1>0$ $-1\ -1$ $x>-1$ $(-1,\infty)$

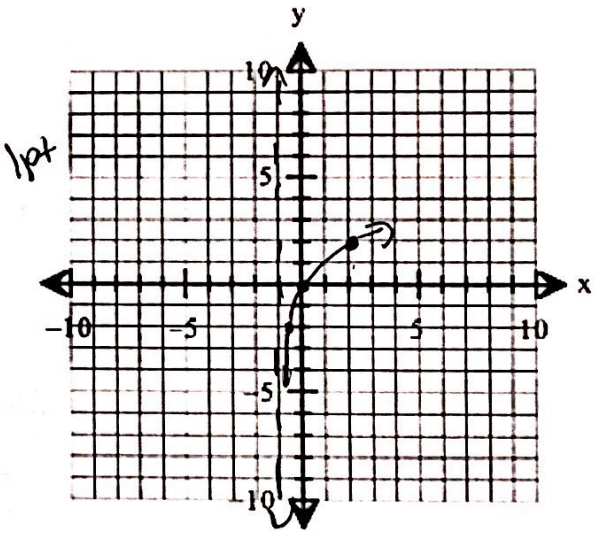
Asymptote: 1pt $x=-1$ ↑ asymptote

Key points and transformations:

	x	$f(x)$	
-1+	1/3	-1	•2
-1+	1	0	•2
-1+	3	1	•2

1pt

x	$f(x)$
-2/3	-2
0	0
2	2



1pt

Range: $(-\infty, \infty)$

Find the inverse $f^{-1}(x)$ for the following: * must show work for credit!

Steps to Find INVERSE
① Replace f(x) with y
② switch x & y
③ Solve for y
④ Replace y with $f^{-1}(x)$

15. $f(x)=2x-3$

① $y=2x-3$

② $x=2y-3$ (+3 +3)

③ $\frac{x+3}{2}=\frac{2y}{2}$

$y=\frac{x+3}{2}$

④ $f^{-1}(x)=\frac{x+3}{2}$

16. $f(x)=\frac{x^3-2}{4}$

① $y=\frac{x^3-2}{4}$

② $x=\frac{y^3-2}{4}$

③ $4x=y^3-2$ (+2 +2)

$\sqrt[3]{4x+2}=\sqrt[3]{y^3}$

$\sqrt[3]{4x+2}=y$

④ $f^{-1}(x)=\sqrt[3]{4x+2}$

17. $f(x)=\sqrt{x+3}$

① $y=\sqrt{x+3}$

② $x=\sqrt{y+3}$

③ $x^2=(\sqrt{y+3})^2$

$x^2-3=y+3$ (-3 -3)

$x^2-3=y$

$f^{-1}(x)=x^2-3$