Math 114 (8:30am – 9:20am)
Midterm 3 Part 1 Version U
Thu Dec 1, 2011

Name: _____

SCORE: _____ / 105 POINTS

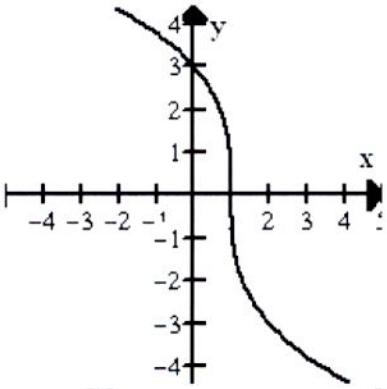
NO CALCULATORS ALLOWED

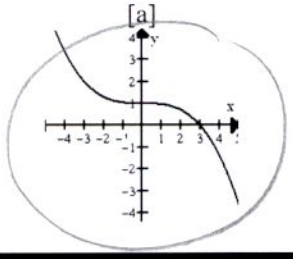
Fill in the blanks. Write "**UNDEFINED**" if the value does not exist. **[NO NEED TO SHOW WORK]** **SCORE: ___ / 21 POINTS**

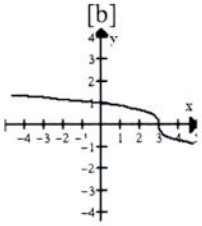
$\log_6 6^{-3} =$ -3 $\log_{21} 1 =$ 0 $4^{\log_4 17} =$ 17 $\log_3 81 =$ 4

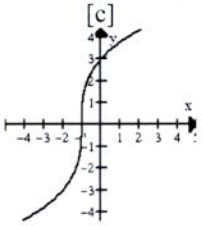
$\log_8(-64) =$ UNDEFINED $\log 1{,}000{,}000 =$ 6 $9^{\log_9 0} =$ UNDEFINED

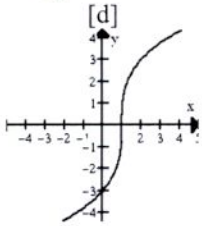
Circle the graph of the inverse of the following function. **SCORE: ___ / 6 POINTS**

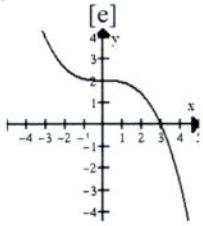


[a] 

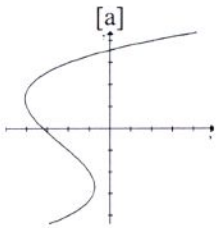
[b] 

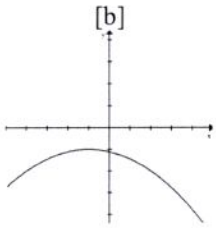
[c] 

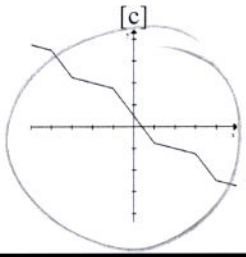
[d] 

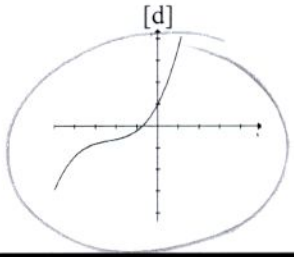
[e] 

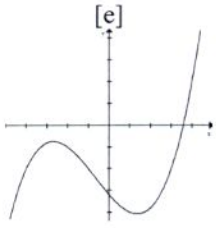
Circle the **two** graphs below which represent one-to-one functions. **SCORE: ___ / 6 POINTS**

[a] 

[b] 

[c] 

[d] 

[e] 

Circle the asymptote of $f(x) = 5^x$. **SCORE: ___ / 3 POINTS**

[a] $x = 0$ [b] $y = 5$ [c] $y = 0$ [d] $x = 5$ [e] $y = 1$

Circle the domain of $f(x) = \log_4 x$. **SCORE: ___ / 3 POINTS**

[a] $\{y > 0\}$ [b] $\{x = 0\}$ [c] $\{x > 0\}$ [d] $\{x > 4\}$ [e] **R**

➡➡➡➡ PUT A BOX AROUND EACH FINAL ANSWER ⬅⬅⬅⬅

Solve for x: $1+4\log_2(5x-7)=13$. **SHOW PROPER WORK. CHECK YOUR ANSWER(S).** **SCORE: ___ / 9 POINTS**

$4\log_2(5x-7)=12$

$\log_2(5x-7)=3$

$2^3=5x-7$

$8=5x-7$

$15=5x$

$\boxed{x=3}$

CHECK: $1+4\log_2(5(3)-7)$

$=1+4\log_2 8$

$=1+4(3)$

$=1+12$

$=13$ ✓

Solve for x: $\log_2(14-6x)-\log_2(1-x)=3$. **SHOW PROPER WORK. CHECK YOUR ANSWER(S).** **SCORE: ___ / 9 POINTS**

$\log_2\frac{14-6x}{1-x}=3$

$2^3=\frac{14-6x}{1-x}$

$8=\frac{14-6x}{1-x}$

$8(1-x)=14-6x$

$8-8x=14-6x$

$-2x=6$

$\boxed{x=-3}$

CHECK:

$\log_2 32-\log_2 4$

$=5-2$

$=3$ ✓

Find the inverse of the function $f(x)=3-\sqrt{11-x}$. **SHOW PROPER WORK.** **SCORE: ___ / 9 POINTS**

$y=3-\sqrt{11-x}$

$x=3-\sqrt{11-y}$

$x-3=-\sqrt{11-y}$

$3-x=\sqrt{11-y}$

$(3-x)^2=11-y$

$(3-x)^2-11=-y$

$11-(3-x)^2=y$

$\boxed{f^{-1}(x)=11-(3-x)^2}$

Find the range of the function $f(x)=3-\sqrt{8+x}$. **SHOW PROPER WORK.** **SCORE: ___ / 6 POINTS**

$\sqrt{8+x}\geq 0$

$-\sqrt{8+x}\leq 0$

$3-\sqrt{8+x}\leq 3$

$\boxed{\{y\leq 3\}}$

Write $\log \frac{t^9}{mb^4}$ as the sums and/or differences and/or multiples of logarithms of single variables. **SCORE: ___ / 6 POINTS**

$9\log t - \log m - 4\log b$

Write $\log 30 - \log 3 + \log 5$ as the logarithm of a single quantity. **Simplify your answer.** **SCORE: ___ / 6 POINTS**

$= \log \frac{30}{3} + \log 5$

$= \log 10 + \log 5$

$= \log(10 \cdot 5)$

$= \boxed{\log 50}$

Solve for x: $4^{x+4} = 8^{2x+12}$. **SHOW PROPER WORK. CHECK YOUR ANSWER(S).** **SCORE: ___ / 9 POINTS**

$(2^2)^{x+4} = (2^3)^{2x+12}$

$2^{2(x+4)} = 2^{3(2x+12)}$

$2(x+4) = 3(2x+12)$

$2x + 8 = 6x + 36$

$-4x = 28$

$\boxed{x = -7}$

CHECK:

$4^{-7+4} = 4^{-3} = \frac{1}{64}$

$8^{2(-7)+12} = 8^{-2} = \frac{1}{64}$

Find the domain of the function $f(x) = \frac{5}{7x+14} + 6$. **SHOW PROPER WORK.** **SCORE: ___ / 6 POINTS**

$7x + 14 \neq 0$

$\boxed{\{x \neq -2\}}$

Find the equation of the asymptote of $f(x) = 4\log_5(3x+21)$. **SHOW PROPER WORK.** **SCORE: ___ / 6 POINTS**

$3x + 21 = 0$

$\boxed{x = -7}$