MAC 2311 - Period: ____ Name: KEY

Quiz 2 - Form A

September 8, 2015

Please write your name and form on your paper.

Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x-11}{2x+4}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\sin\left(2\tan^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\log_2(5-5x) - \log_2(1+x^2) = \log_2 2$. (*2 points*)

MAC 2311 - Period: ____ Name: _____

Quiz 2 - Form B

September 8, 2015

Write your name and form on both sheets of paper.

Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x+11}{2x-4}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\sin\left(2\cot^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\log_6(2-x) - \log_6(7-x) = 2$. (*2 points*)

MAC 2311 - Period: ____ Name: _____

Quiz 2 - Form C

September 8, 2015

Write your name and form on both sheets of paper.

Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x-5}{3x+9}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\cos\left(2\tan^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $2\log_7(x) = \log_7(2) + \log_7(x+40)$. (*2 points*)

MAC 2311 - Period: ____ Name: _____

Quiz 2 - Form D

September 8, 2015

Write your name and form on both sheets of paper.

Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x+5}{3x-9}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\cos\left(2\cot^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\ln(5-5x) - \ln(1+x^2) = \ln e$. (*2 points*)

Problem References:

1. Section 1.5 #4 and Webassign HW 2 #3.
2. Section 1.5 #39,40 and Webassign HW 2 #9.
3. Section 1.6 #28,33,34 and Webassign HW 2 #17,18.

MAC 2311 - Period: ____
Quiz 2 - Form A
September 8, 2015

Name: _____
Please write your name and form on your paper.
Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x-11}{2x+4}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\sin\left(2\tan^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\log_2(5-5x) - \log_2(1+x^2) = \log_2 2$. (*2 points*)

1. Let $x = \dfrac{y-11}{2y+4} \iff 2xy+4x = y-11 \iff 4x+11 = y-2xy$

(1/2) for work

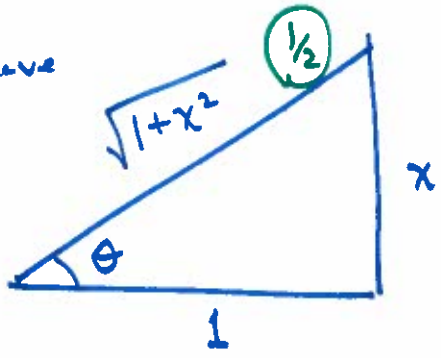
$\iff y(1-2x) = 4x+11$

$\iff f^{-1}(x) = y = \dfrac{4x+11}{1-2x}$ (1/2)

(1/2) Domain of $f^{-1}(x)$: Solve $1-2x=0 \Rightarrow x=\frac{1}{2}$. Domain: $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$.

(1/2) Invertible: Use graph or let $f(a)=f(b)$ then show $a=b$.

2. Let $\theta = \tan^{-1} x$. So $\tan\theta = x$. We have



Original expression is

$\sin 2\theta = 2\sin\theta\cos\theta$ (1/2)

$= 2\left(\dfrac{x}{\sqrt{1+x^2}}\right)\left(\dfrac{1}{\sqrt{1+x^2}}\right) = \dfrac{2x}{1+x^2}$ (1/2)

(1/2) Holds for x on $(-\infty, \infty)$.

3. Condense the expression: (1) $\log_2\left(\dfrac{5-5x}{1+x^2}\right) = \log_2 2$

Using one-to-one property of logs: (1) $\dfrac{5-5x}{1+x^2} = 2$.

MAC 2311 - Period: ____
Quiz 2 - Form B
September 8, 2015

Name: _____
Write your name and form on both sheets of paper.
Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x+11}{2x-4}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\sin\left(2\cot^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\log_6(2-x) - \log_6(7-x) = 2$. (*2 points*)

1. Let $x = \dfrac{y+11}{2y-4} \iff 2xy - 4x = y + 11 \iff 2xy - y = 4x + 11$

(1/2) for work

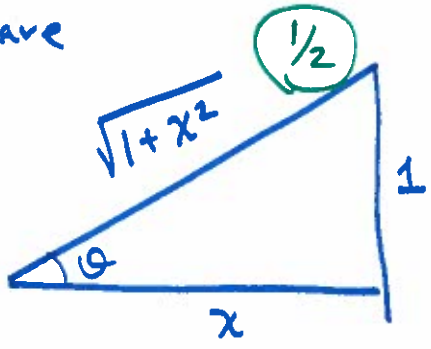
$\iff y(2x-1) = 4x + 11$

$\iff f^{-1}(x) = y = \dfrac{4x+11}{2x-1}$. (1/2)

Domain of $f^{-1}(x)$: Solve $2x-1=0 \to x = \frac{1}{2}$. Domain: $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$. (1/2)

(1/2) Invertible: Use graph or let $f(a)=f(b)$ then show $a=b$.

2. Let $\theta = \cot^{-1} x$. Then $\cot\theta = x$. We have



Original expression is

$\sin 2\theta = 2\sin\theta\cos\theta$ (1/2)

$= 2\left(\dfrac{1}{\sqrt{1+x^2}}\right)\left(\dfrac{x}{\sqrt{1+x^2}}\right) = \dfrac{2x}{1+x^2}$. (1/2)

(1/2) Holds for x on $(-\infty, \infty)$.

3. Condense L.H.S. of expression: (1) $\log_6\left(\dfrac{2-x}{7-x}\right) = 2$

Rewrite in exponential form: (1) $\dfrac{2-x}{7-x} = 6^2 = 36$.

Form C

1. Let $x = \frac{y-5}{3y+9} \iff 3xy+9x = y-5$

$\iff 9x+5 = y-3xy$

(1/2) for work

$\iff y(1-3x) = 9x+5$

$\iff f^{-1}(x) = y = \frac{9x+5}{1-3x}$ (1/2)

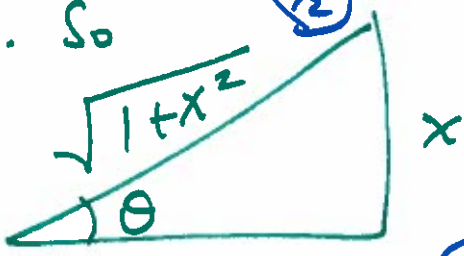
(1/2) Domain: Solve $1-3x=0 \to x=\frac{1}{3}$. D: $(-\infty, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$.

(1/2) Invertible: Use graph w/ horizontal line test

OR

Let $f(a)=f(b)$ and show $a=b$.

2. Let $\theta = \tan^{-1}x \to \tan\theta = x$. So (1/2)



Now the original expression is equivalent to

$\cos 2\theta = \cos^2\theta - \sin^2\theta = \left(\frac{1}{\sqrt{1+x^2}}\right)^2 - \left(\frac{x}{\sqrt{1+x^2}}\right)^2 = \frac{1-x^2}{1+x^2}$. (1/2)

(1/2) Domain: Holds for all x in $(-\infty, \infty)$

3. Condense R.H.S. (1) $\log_7(x^2) = \log_7(2x+80)$

Using one-to-one property of logs: (1) $x^2 = 2x+80$.

MAC 2311 - Period: _____
Quiz 2 - Form D
September 8, 2015

Name: _____
Write your name and form on both sheets of paper.
Show your work to earn full credit.

1. Show that $f(x) = \dfrac{x+5}{3x-9}$ is invertible, find its inverse, then find the domain of $f^{-1}(x)$. (*2 points*)

2. Rewrite $\cos\left(2\cot^{-1}(x)\right)$ as an algebraic expression of x then state the domain on which the equivalence is valid. (*2 points*)

3. Solve the following equation for x: $\ln(5-5x) - \ln(1+x^2) = \ln e$. (*2 points*)

1. Let $x = \dfrac{y+5}{3y-9} \iff 3xy - 9x = y + 5 \iff 3xy - y = 9x + 5$

$\iff y(3x-1) = 9x+5$

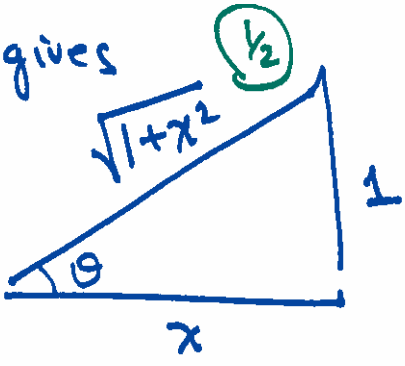
$\iff f^{-1}(x) = y = \dfrac{9x+5}{3x-1}$ (1/2)

(1/2) for work

(1/2) Domain of $f^{-1}(x)$: Solve $3x-1=0 \to x = \frac{1}{3}$. Domain: $(-\infty, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$.

(1/2) Invertible: Use graph or let $f(a) = f(b)$ then show $a = b$.

2. Let $\theta = \cot^{-1} x$. So $\cot\theta = x$. This gives



The original expression is now

(1/2) $\cos 2\theta = \cos^2\theta - \sin^2\theta$

$= \left(\dfrac{x}{\sqrt{1+x^2}}\right)^2 - \left(\dfrac{1}{\sqrt{1+x^2}}\right)^2 = \dfrac{x^2-1}{x^2+1}$. (1/2)

(1/2) This holds for x on $(-\infty, \infty)$.

3. Condense L.H.S.: (1) $\ln\left(\dfrac{5-5x}{1+x^2}\right) = \ln e$

Using one-to-one property of logarithms: (1) $\dfrac{5-5x}{1+x^2} = e$.