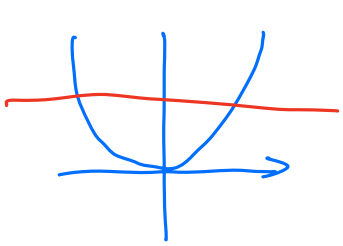
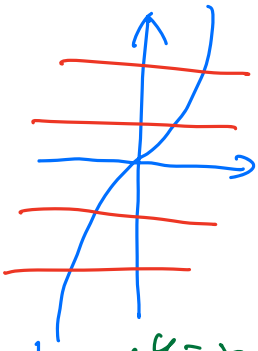
Quiz5, MAT1375 Professor Chiu

ID:_____ Name: Sol

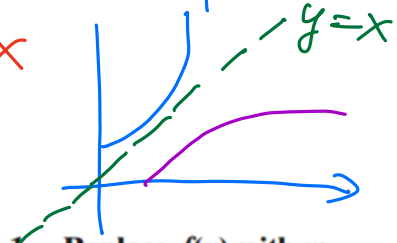
- This quiz consists of 6 questions for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Wishing you success.





(5 points) True or False questions:

1. T Let $f(x)$ be an invertible function. Then $f(f^{-1}(x)) = x$ and $f^{-1}(f(x)) = x$.
2. F The function $f(x) = x^2$ has an inverse function.
3. T The function $f(x) = x^3$ has an inverse function.
4. F Let f and g be two functions and $f(g(x)) = x$. Then $g = f^{-1}$. and $g(f(x)) = x$
5. T The graph of f^{-1} is the graph of f reflected about the line $y = x$.



Show all your work and justify your answer:

Step 1 **Replace $f(x)$ with y:**
Step 2 **Interchange x and y:**
Step 3 **Solve for y:**
Step 4 **Replace y with $f^{-1}(x)$:**

(5 points) 6. Use the 4-steps strategy to find the inverse of the function

$$f(x) = \frac{3x+1}{3x-2}.$$

Step 1 $y = \frac{3x+1}{3x-2}$

Step 2 $x = \frac{3y+1}{3y-2}$

Step 3

$(3y-2)\cdot x = \frac{3y+1}{(3y-2)}\cdot(3y-2)$

$\Rightarrow (3y-2)\cdot x = 3y+1$

$\Rightarrow 3xy - 2x = 3y + 1$

$\Rightarrow 3xy - 3y = 1 + 2x$

$\Rightarrow y\,(3x-3) = 1+2x$

$\Rightarrow y = \frac{1+2x}{3x-3}$

Step 4 $f^{-1}(x) = \frac{1+2x}{3x-3}$