# Inverse Function Practice Problem 2

Math 130 *Kovitz*

$$\text{Let } f(x) = \frac{3x-2}{4x+5}$$

1. Find $f^{-1}(x)$
2. Find
   (a) $f(-1)$
   (b) $f^{-1}(-1)$
3. Find
   (a) $f^{-1}(f(-1))$
   (b) $f(f^{-1}(-1))$
4. True or false: $f$ is its own inverse
   (i.e. $f$ is symmetric with respect to the line $y = x$).
5. Take any point on $f$. Reflect it across the line $y = x$.

   Is the resulting point on $f$?

   Is the resulting point on $f^{-1}$?

# ANSWERS FOLLOW

# Answers.

1. $f^{-1}(x) = \dfrac{5x+2}{3-4x}$.

2. (a) $f(-1) = -5$.

   (b) $f^{-1}(-1) = -3/7$.

3. (a) $-1$.

   (b) $-1$.

4. False. The functions $f$ and $f^{-1}$ are not equivalent, meaning they have different solution sets and different graphs.

5. An example would be choosing the point $(-1.5, 6.5)$. Its reflection across the line $y = x$ is the point $(6.5, -1.5)$.

   The resulting point $(6.5, -1.5)$ is not on $f$ since $\frac{3(6.5)-2}{4(6.5)+5} = \frac{17.5}{31} \neq -1.5$.

   When $f$ is its own inverse, the reflected point will always be on $f$; otherwise—as is the case here—it may not.

   The resulting point $(6.5, -1.5)$ is on $f^{-1}$ since $\frac{5(6.5)+2}{3-4(6.5)} = \frac{34.5}{-23} = -1.5$.

   If the point $(0, -2/5)$ were the point chosen, the results would similarly have been:

   $f(-2/5) = \frac{-3.2}{3.4} \neq 0$ and $f^{-1}(-2/5) = \frac{0}{4.6} = 0$.