Practice Problems for Math Success

Inverse Functions

These **practice problems** are designed to help you **prepare for our course exams** and **assess your understanding** of the course material at the expected level. Aim to complete them **in class, during tutoring, office hours, or on your own**, and try to solve them **without notes or a calculator**, just like on the **actual exams**. Remember, **practice makes perfect**, so don't hesitate to **ask for help** if you get stuck.

1. Find a formula for $f^{-1}(x)$ if
$$f(x) = \frac{2 - \dfrac{1}{x}}{3 - \dfrac{2}{x}}.$$

2. Find a formula for $f^{-1}(x)$ if
$$f(x) = \sqrt{\frac{3 - 7x}{4 - x}}.$$

3. Find a formula for $f^{-1}(x)$ if
$$f(x) = \frac{\sqrt{2x} + 7}{9 - \sqrt{2x}}.$$

4. The table below gives some values of the functions f, g, and h. Here f, g, h are invertible and defined for all values of x. Furthermore, $h(x) = f^{-1}(x)$.

x	$f(x)$	$g(x)$	$h(x)$
2	$\frac{3}{2}$	-4	1
-4	5	$\frac{3}{7}$	-2

Evaluate each of the following expressions, or if the given information is insufficient, write "NEI" for not enough information.

(a) $f(g(2))$=_____.

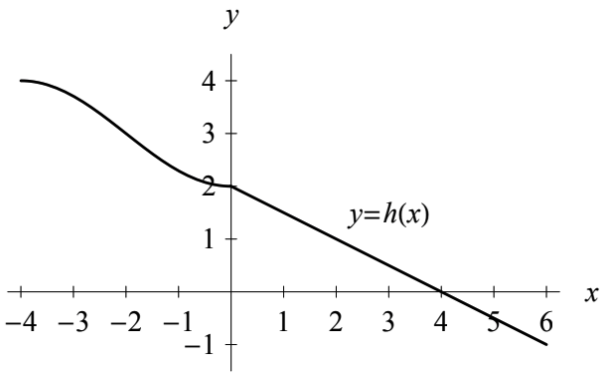
(b) $f^{-1}(5)$ =_____.

(c) $(f(5))^{-1}$ =_____.

(d) $h(f(-4))$ =_____.

(e) $g(2) - 7[f(-4)]^{-2}$ =_____.

5. The graph of h is given in the figure below. Find the **exact** value of each of the following expressions.



(a) $h^{-1}(2) =$ _____.

(b) $(h(1))^{-1} =$ _____.

(c) $h^{-1}(h(1)) - h^{-1}(1)h(1) =$ _____.

(d) Among the numbers $0, h^{-1}(1), h^{-1}(3)$, and $h^{-1}(4)$, the largest one is _____.