Verifying Inverses with Composition Name: _____A#____

When composing two functions, if $f\big(g(x)\big) = x$ and $g\big(f(x)\big) = x$, then you know $f(x)$ and $g(x)$are inverses.

1. Consider the following functions $f(x) = 2x - 6$ and $g(x) = \frac{1}{2}x + 3$.

a. Find $f\big(g(2)\big)$

b. Find $g\big(f(2)\big)$

c. What do you notice from your results of a and b?

d. Is this enough to justify that $f(x)$ and $g(x)$are inverses? How could you show that this works for every x-value?

2. Justify the following functions are inverses by showing $f\big(f^{-1}(x)\big) = f^{-1}\big(f(x)\big) = x$

$$f(x) = \sqrt{x} - 2 \quad and \;\; f^{-1}(x) = (x+2)^2 \; when \; x \geq -2$$

3. Use composition of functions to determine if the following functions are inverses. Show your work and write your conclusion in a complete sentence.

$$f(x) = -5x + 25 \;\; and \;\; g(x) = -\frac{1}{5}x - 25$$

4. Explain in your own words how to show that a function undoes another function.

For each of the following functions use composition of functions to determine if the two are inverses.

CP ONLY 5. $f(x) = -\frac{4}{7}x - \frac{16}{7}$ $g(x) = \frac{3}{2}x - \frac{3}{2}$	HN ONLY 6. $f(n) = 2(n-2)^3$ $g(n) = \frac{4 + \sqrt[3]{4n}}{2}$
7. $f(n) = \frac{-16+n}{4}$ $g(n) = 4n + 16$	8. $g(x) = (x-2)^2 + 5$ $f(x) = \sqrt{x-5} + 2$
9. $g(x) = 4 - \frac{3}{2}x$ $f(x) = \frac{1}{2}x + \frac{3}{2}$	10. $g(x) = -\frac{2}{x} - 1$ $f(x) = -\frac{2}{x+1}$