Precalculus Functions Name_____

1.8 Unique Compositions

Perform a composition and simplify given the two functions (either $f(g(x))$ or $g(f(x))$).

1) $g(x) = (x-1)^3 + 1$
$f(x) = \sqrt[3]{x-1} + 1$

2) $g(x) = 1 + (x+1)^3$
$f(x) = \sqrt[3]{x-1} - 1$

3) $f(x) = 2(x+2)^5$
$g(x) = \dfrac{-4 + \sqrt[5]{16x}}{2}$

4) $g(x) = \dfrac{-20 + 6x}{5}$
$f(x) = \dfrac{5x + 20}{6}$

Find the inverse of each function. If you're unsure of correctness, check your work using the composition method.

5) $f(x) = \frac{4}{x} + 3$

6) $f(x) = -\frac{2}{x-2} - 2$

7) $h(x) = \sqrt[5]{x-1} - 1$

8) $g(x) = 3 + x^5$

9) $g(x) = -2x^5$

10) $h(x) = \sqrt[3]{\frac{x-1}{2}}$

CHALLENGE! Find the inverse of each function. Check your work using the composition method.

11) $f(x) = \frac{x+2}{3x+5}$

12) $g(x) = \frac{7-x}{5x-2}$

State if the given functions are inverses. Use the composition method (either $f(g(x))$ or $g(f(x))$).

13) $h(x) = 6x^3 + 3$

$f(x) = \frac{\sqrt[3]{x - 3}}{6}$

14) $g(x) = -2(x + 3)^3$

$f(x) = \frac{-6 - \sqrt[3]{4x}}{2}$

15) $g(x) = -2x^5 + 1$

$f(x) = \sqrt[5]{\frac{-x + 1}{2}}$

16) $f(x) = \frac{2x - 10}{3}$

$h(x) = -\frac{5}{6}x - \frac{10}{3}$

17) Assume two functions are inverses of each other. Given any function and its inverse, find $f(f(42))$. Explain your reasoning.

Answers to 1.8 Unique Compositions

1) Yes

2) Yes

3) Yes

4) Yes

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

6) $f^{-1}(x) = \dfrac{2}{x+2} + 2$

7) $h^{-1}(x) = (x+1)^5 + 1$

8) $g^{-1}(x) = \sqrt[5]{x-3}$

9) $g^{-1}(x) = -\dfrac{\sqrt[5]{16x}}{2}$

10) $h^{-1}(x) = 2x^3 + 1$

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

12) $g^{-1}(x) = \dfrac{2x+7}{5x+1}$

13) No

14) Yes

15) Yes

16) No

17)