

Unit 1.4 Notes: Composition of Functions

Given the following functions, calculate the compositions, state the domain, and evaluate.

$$f(x) = x^2 - 1 \quad g(x) = \sqrt{2x+5} \quad h(x) = \frac{x}{x+1} \quad j(x) = 9 - x^2 \quad k(x) = 2x - 3$$

1. _____ $f(k(x))$
 _____ domain of $f(k(x))$
 _____ $f(k(3))$

2. _____ $g(f(x))$
 _____ domain of $g(f(x))$
 _____ $g(f(5))$

3. _____ $h(k(x))$
 _____ domain of $h(k(x))$
 _____ $h(k(4))$

4. _____ $j(g(x))$
 _____ domain of $j(g(x))$
 _____ $j(g(7))$

5. _____ $h(f(x))$
 _____ domain of $h(f(x))$
 _____ $h(f(-2))$

6. Prove $f(x) = 3x - 2$ & $g(x) = \frac{x+2}{3}$ are inverses of each other.

Given the following functions, calculate the compositions, state the domain, and evaluate.

$$f(x) = x^2 - 5$$

$$g(x) = \sqrt{x-11}$$

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

$$j(x) = 3x - 4$$

$$k(x) = 2x - 3$$

1. _____ $f(g(x))$
 _____ domain of $f(g(x))$
 _____ $f(g(-2))$

2. _____ $g(f(x))$
 _____ domain of $g(f(x))$
 _____ $g(f(5))$

3. _____ $g(k(x))$
 _____ domain of $g(k(x))$
 _____ $g(k(10))$

4. _____ $j(k(x))$
 _____ domain of $j(k(x))$
 _____ $j(k(9))$

5. Prove that h and j are inverses, that is to prove $h(j(x)) = x$ and $j(h(x)) = x$.