

1. Consider the functions

$$f(t) = t^2 + 6t \quad \text{and} \quad g(t) = t - 5.$$

a. Evaluate $f(0)$, $f(2)$, $g(-2)$, and $g(3)$.

b. Write the composite function $f(g(t))$ in simplest form. Also, write the composite function $g(f(t))$ in simplest form.

c. Evaluate $f(g(1))$ and $g(f(1))$.

2. Consider the function

$$f(x) = -x^2 + 3x + 5.$$

Evaluate $f(0)$, $f(-\frac{1}{4})$, $f(a)$, $f(\frac{1}{d})$

3. Consider the function

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

Evaluate $f(0)$, $f(-\frac{1}{3})$, $f(a)$, $f(\frac{2}{d})$.

For the following functions, evaluate and simplify the following expressions:

$$f(x + h), \quad f(x + h) - f(x), \quad \frac{f(x + h) - f(x)}{h}.$$

4. $f(x) = 1 - 5x^2$. 5. $f(x) = \frac{5}{x + 5}$. 6. $f(x) = \frac{4}{x^2}$

7. Consider the functions

$$f(x) = 3x^2 + 3x + 4 \quad \text{and} \quad g(x) = 2x - 6.$$

a. Write the composite function $f(g(x))$ in simplest form. Also, write the composite function $g(f(x))$ in simplest form.

b. Evaluate $f(g(2))$ and $g(f(2))$.

8. Consider the function

$$f(x) = 9 - x^2.$$

a. Find the range of this function (assuming a domain of all x).

b. Find the domain of $f(x)$, if the range of f is restricted to $f(x) > 0$.

For the following functions, find the domain and range. Write the answers in interval notation. State if the function is ODD, EVEN, or NEITHER.

9. $f(x) = (x - 3)^2$,

10. $y = \sqrt{9 - x}$,

11. $y = \sqrt{49 - x^2}$,

12. $f(x) = \sqrt{\frac{25}{x^2 + 4}}$,

13. $f(x) = x^7$,

14. $f(x) = |x - 5|$,

15. $f(x) = \sqrt{\frac{x + 3}{x - 3}}$.

