

1.5.1 EXERCISES

In Exercises 1 - 10, use the pair of functions f and g to find the following values if they exist.

- $(f + g)(2)$
- $(f - g)(-1)$
- $(g - f)(1)$
- $(fg)\left(\frac{1}{2}\right)$
- $\left(\frac{f}{g}\right)(0)$
- $\left(\frac{g}{f}\right)(-2)$

1. $f(x) = 3x + 1$ and $g(x) = 4 - x$

2. $f(x) = x^2$ and $g(x) = -2x + 1$

3. $f(x) = x^2 - x$ and $g(x) = 12 - x^2$

4. $f(x) = 2x^3$ and $g(x) = -x^2 - 2x - 3$

5. $f(x) = \sqrt{x+3}$ and $g(x) = 2x - 1$

6. $f(x) = \sqrt{4-x}$ and $g(x) = \sqrt{x+2}$

7. $f(x) = 2x$ and $g(x) = \frac{1}{2x+1}$

8. $f(x) = x^2$ and $g(x) = \frac{3}{2x-3}$

9. $f(x) = x^2$ and $g(x) = \frac{1}{x^2}$

10. $f(x) = x^2 + 1$ and $g(x) = \frac{1}{x^2 + 1}$

In Exercises 11 - 20, use the pair of functions f and g to find the domain of the indicated function then find and simplify an expression for it.

- $(f + g)(x)$
- $(f - g)(x)$
- $(fg)(x)$
- $\left(\frac{f}{g}\right)(x)$

11. $f(x) = 2x + 1$ and $g(x) = x - 2$

12. $f(x) = 1 - 4x$ and $g(x) = 2x - 1$

13. $f(x) = x^2$ and $g(x) = 3x - 1$

14. $f(x) = x^2 - x$ and $g(x) = 7x$

15. $f(x) = x^2 - 4$ and $g(x) = 3x + 6$

16. $f(x) = -x^2 + x + 6$ and $g(x) = x^2 - 9$

17. $f(x) = \frac{x}{2}$ and $g(x) = \frac{2}{x}$

18. $f(x) = x - 1$ and $g(x) = \frac{1}{x - 1}$

19. $f(x) = x$ and $g(x) = \sqrt{x+1}$

20. $f(x) = \sqrt{x-5}$ and $g(x) = f(x) = \sqrt{x-5}$

In Exercises 21 - 45, find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$ for the given function.

21. $f(x) = 2x - 5$

22. $f(x) = -3x + 5$

23. $f(x) = 6$

24. $f(x) = 3x^2 - x$

25. $f(x) = -x^2 + 2x - 1$

26. $f(x) = 4x^2$