

5.5 Performing Function Operations DAY ONE CYU

Use when you get it right all by yourself
S Use when you did it all by yourself, but made a silly mistake
H Use when you could do it alone with a little help from teacher or peer
G Use when you completed the problem in a group
X Use when a question was attempted but wrong (get help)
N Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Adding Functions	1	2	
Subtracting Functions	1	2	
Evaluating Functions	1, 3	2, 4	5, 6
Domain of functions	1, 3	2, 4	5, 6
Multiplying Functions	3	4	5, 6
Dividing Functions	3	4	5, 6
Modeling Mathematics	7, 8	9	10

Find $(f + g)(x)$ and $(f - g)(x)$ and state the domain of each. Then evaluate $f + g$ and $f - g$ for the given value of x .

1. $f(x) = 6x - 4x^2 - 7x^3$ & $g(x) = 9x^2 - 5x$; $x = -1$

$(f+g)(x) = -7x^3 + 5x^2 + x \quad (-\infty, \infty)$

$(f-g)(x) = -7x^3 - 13x^2 + 11x \quad (-\infty, \infty)$

$(f+g)(-1) = 11$

$(f-g)(-1) = -17$

2. $f(x) = 11x + 2x^2$ & $g(x) = -7x - 3x^2 + 4$; $x = 2$

$(f+g)(x) = -x^2 + 4x + 4 \quad (-\infty, \infty)$

$(f-g)(x) = 5x^2 + 18x - 4 \quad (-\infty, \infty)$

$(f+g)(2) = 8$

$(f-g)(2) = 52$

Find $(fg)(x)$ and $(\frac{f}{g})(x)$ and state the domain of each. Then evaluate fg and $\frac{f}{g}$ for the given value of x .

3. $f(x) = 2x^3$ & $g(x) = \sqrt[3]{x}$; $x = -27$

$(fg)(x) = 2x^{\frac{10}{3}} \quad (-\infty, \infty)$

$(\frac{f}{g})(x) = 2x^{\frac{8}{3}} \quad (-\infty, 0) \cup (0, \infty)$

$(fg)(-27) = 118,098$

$(\frac{f}{g})(-27) = 13,122$

5. $f(x) = 11x^3$ & $g(x) = 7x^{\frac{7}{3}}$; $x = -8$

$(fg)(x) = 77x^{\frac{16}{3}} \quad (-\infty, \infty)$

$(\frac{f}{g})(x) = \frac{11}{7}x^{\frac{2}{3}} \quad (-\infty, 0) \cup (0, \infty)$

$(fg)(-8) = 5,046,272$

$(\frac{f}{g})(-8) = \frac{44}{7}$

4. $f(x) = x^4$ & $g(x) = 3\sqrt{x}$; $x = 4$

$(fg)(x) = 3x^{\frac{7}{2}} \quad [0, \infty)$

$(\frac{f}{g})(x) = \frac{x^{\frac{7}{2}}}{3} \quad (0, \infty)$

$(fg)(4) = 1536$

$(\frac{f}{g})(4) = \frac{128}{3}$

6. $f(x) = 4x^{\frac{5}{4}}$ & $g(x) = 2x^{\frac{1}{2}}$; $x = 16$

$(fg)(x) = 8x^{\frac{7}{4}} \quad [0, \infty)$

$(\frac{f}{g})(x) = 2x^{\frac{3}{4}} \quad (0, \infty)$

$(fg)(16) = 1024$

$(\frac{f}{g})(16) = 16$

7. **MODELING WITH MATHEMATICS** From 1990 to 2010, the numbers (in millions) of female F and male M employees from the ages of 16 to 19 in the United States can be modeled by $F(t) = -0.007t^2 + 0.10t + 3.7$ and $M(t) = 0.0001t^3 - 0.009t^2 + 0.11t + 3.7$, where t is the number of years since 1990.

a) Find $(F + M)(t)$.

b) Explain what $(F + M)(t)$ represents.

$$0.0001t^3 - 0.016t^2 + 0.21t + 7.4$$

all employees 16-19 yrs old in the U.S. from 1990-2010.

8. **MODELING WITH MATHEMATICS** From 2005 to 2009, the numbers of cruise ship departures (in thousands) from around the world W and Florida F can be modeled by the equations

$$W(t) = -5.833t^3 + 17.43t^2 + 509.1t + 11496$$

$$F(t) = 12.5t^3 - 60.29t^2 + 136.6t + 4881$$

Where t is the number of years since 2005.

a) Find $(W - F)(t)$.

b) Explain what $(W - F)(t)$ represents.

$$= -18.3333t^3 + 77.72t^2 + 372.5t + 6615$$

of cruise ships departures (in 1000's) from everywhere except Florida

9. **MAKING AN ARGUMENT** Your friend claims that the addition of functions and the multiplication of functions are commutative. Is your friend correct? Explain your reasoning.

friend is correct. order does not matter

$$2 + 3 = 5$$

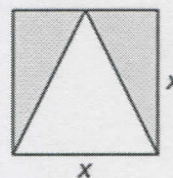
$$2(3) = 6$$

$$3 + 2 = 5$$

$$3(2) = 6$$

10. **MATHEMATICAL CONNECTIONS** A triangle is inscribed in a square, as shown. Write and simplify a function r in terms of x that represents the area of the shaded region.

$$r(x) = x^2 - \frac{1}{2}x^2 = \frac{1}{2}x^2$$



CYU Reflection: How far can you go: basic, intermediate, or advanced?

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

