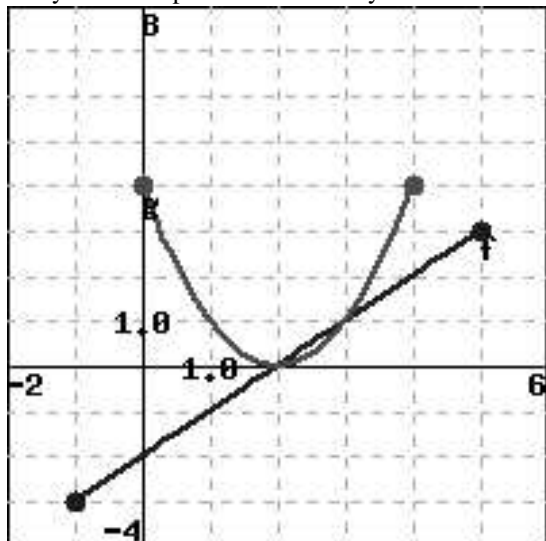


1.(1 pt) Let f be the linear function (in blue) and let g be the parabolic function (in red) below.

If you are having a hard time seeing the picture clearly, click on the picture. It will expand to a larger picture on its own page so that you can inspect it more closely.



Note: If the answer does not exist, enter 'DNE':

1. $(f \circ g)(2) =$ _____
2. $(g \circ f)(2) =$ _____
3. $(f \circ f)(2) =$ _____
4. $(g \circ g)(2) =$ _____
5. $(f + g)(4) =$ _____
6. $(f / g)(2) =$ _____

2.(1 pt) This problem tests calculating new functions from old ones:
From the table below calculate the quantities asked for:

x	3	26	-22	-48	48	-3
$f(x)$	48	35100	-21252	-221088	221088	-48
$g(x)$	-22	-17548	10628	110546	-110542	26

_____ $f(f(-3))$
 _____ $(f + g)(-3)$
 _____ $g(f(-3))$

Tip: Sometimes webwork will do arithmetic for you. For example you can type in $4*11$ instead of 44 and webwork will do the calculation for you. This works with many numerical problems, although not all of them.

3.(1 pt)

This problem tests calculating new functions from old ones:
From the table below calculate the quantities asked for:

x	1	0	2	-1
$f(x)$	0	0	-4	2
$g(x)$	-2	1	-3	0

_____ $f(f(0))$
 _____ $(fg)(-1)$
 _____ $(f + g)(0)$

Tip: Sometimes WeBWorK will do arithmetic for you. For example, you can type in $4*11$ instead of 44, and WeBWorK will do the calculation for you. This works with many numerical problems, although not all of them.

4.(1 pt)

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

$(f \circ g)(7) =$ _____

5.(1 pt)

Let $f(x) = 2x + 5$ and $g(x) = 3x^2 + 4x$.

After simplifying,

$(f \circ g)(x) =$ _____

6.(1 pt) Let $f(x) = 3x + 3$ and $g(x) = 5x^2 + 2x$. Match the statements defined below with the letters labeling their equivalent expressions.

You must get all of the answers correct to receive credit.

- 1. $g \circ g$
- 2. $f \circ g$
- 3. $g \circ f$
- 4. $f \circ f$

A. $45x^2 + 96x + 51$

B. $15x^2 + 6x + 3$

C. $9x + 12$

D. $125x^4 + 100x^3 + 30x^2 + 4x$

7.(1 pt) This problem gives you some practice identifying how more complicated functions can be built from simpler functions.

Let $f(x) = x^3 - 27$ and let $g(x) = x - 3$. Match the functions defined below with the letters labeling their equivalent expressions.

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

A. $81 - 27x - 3x^3 + x^4$

B. $-54 + 27x - 9x^2 + x^3$

C. $729 - 54x^3 + x^6$

D. $-30 + x^3$

8.(1 pt) Let $f(x) = 6x^2 + 9$, $g(x) = 5x^3$, and $h(x) = \frac{1}{4x}$. Then $f \circ g \circ h(1) =$ _____

9.(1 pt)

Let $f(x) = \sqrt{90 - x}$ and $g(x) = x^2 - x$.

Then the domain of $f \circ g$ is equal to $[a, b]$ for

$a =$ _____

and

$b =$ _____

10.(1 pt)

Let $f(x) = \frac{1}{x-1}$ and $g(x) = \frac{1}{x-7}$.

Then the domain of $f \circ g$ is equal to all reals except for two values, a and b with $a < b$ and

$a =$ _____

$b =$ _____

11.(1 pt)

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

Then $(f \circ g)(2) =$ _____

After simplifying,

$(f \circ g)(x) =$ _____

12.(1 pt)

Let $f(x) = \frac{1}{x-4}$ and $g(x) = 4x + 11$.

Then $(f \circ g)(6) =$ _____

After simplifying,

$(f \circ g)(x) =$ _____

13.(1 pt)

Let $f(x) = 4 - \sqrt{x^2 + 1}$ and $g(x) = x - 3$.

Then $(f \circ g)(8) =$ _____

After simplifying,

$(f \circ g)(x) =$ _____

14.(1 pt)

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

After simplifying,

$(f \circ g)(x) =$ _____

and after simplifying,

$(g \circ f)(x) =$ _____

15.(1 pt)

Let $f(x) = \frac{1}{x-4}$ and $g(x) = \frac{7}{x} + 4$.

After simplifying,

$(f \circ g)(x) =$ _____

and after simplifying,

$(g \circ f)(x) =$ _____

16.(1 pt) Given that $f(x) = 9x^2 + 4$ and $g(x) = 6x + 4$ are functions from \mathbb{R} to \mathbb{R} , find

(a) $f \circ g$.

(b) $g \circ f$.
