WebAssign

1.3 Combinaciones y Composición de Funcion (Homework)

David Corzo
Diferencial, section B, Spring 2019
Instructor: Christiaan Ketelaar

Current Score : 34 / 31 **Due :** Tuesday, February 5, 2019 11:58 PM CST**Last Saved : n/a Saving... ()**

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension

1. 3/3 points | Previous AnswersSCalc8 1.3.031.

Find each of the following functions and state their domains. (Enter the domains in interval notation.)

$f(x) = x^3 + 5x^2, \quad g(x) = 6x^2 - 1$

(a) $f + g$

$$x3+11x2−1

$f + g =$

$x^3 + 11x^2 - 1$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(b) $f - g$

$$x3−x2+1

$f - g =$

$x^3 - x^2 + 1$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(c) fg

$$6x5−x3+30x4−5x2

$fg =$

$(x^3 + 5x^2)(6x^2 - 1)$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(d) f/g

$$x2(x+5)6x2−1

$f/g =$

$\frac{x^3 + 5x^2}{6x^2 - 1}$

$$(−∞,−√16)∪(−√16,√16)∪(√16,∞)

domain

$\left(-\infty, -\sqrt{\frac{1}{6}}\right) \cup \left(-\sqrt{\frac{1}{6}}, \sqrt{\frac{1}{6}}\right) \cup \left(\sqrt{\frac{1}{6}}, \infty\right)$

Solution or Explanation

Click to View Solution

2. 3/3 points | Previous AnswersSCalc8 1.3.032.

Find each of the following functions.

$f(x) = \sqrt{5 - x}$, $g(x) = \sqrt{x^2 - 9}$

(a) $f + g$

$$\sqrt{5-x}+\sqrt{x2-9}$$

$\sqrt{5 - x} + \sqrt{x^2 - 9}$

State the domain of the function. (Enter your answer using interval notation.)

$$(-\infty,-3]\cup[3,5]$$

$(-\infty, -3] \cup [3, 5]$

(b) $f - g$

$$\sqrt{5-x}-\sqrt{x2-9}$$

$\sqrt{5 - x} - \sqrt{x^2 - 9}$

State the domain of the function. (Enter your answer using interval notation.)

$$(-\infty,-3]\cup[3,5]$$

$(-\infty, -3] \cup [3, 5]$

(c) fg

$$\sqrt{(5-x)(x-3)(x+3)}$$

$\sqrt{5 - x}\sqrt{x^2 - 9}$

State the domain of the function. (Enter your answer using interval notation.)

$$(-\infty,-3]\cup[3,5]$$

$(-\infty, -3] \cup [3, 5]$

(d) f/g

$$\sqrt{5-x}\sqrt{x2-9}$$

$\dfrac{\sqrt{5 - x}}{\sqrt{x^2 - 9}}$

State the domain of the function. (Enter your answer using interval notation.)

$$(-\infty,-3)\cup(3,5]$$

$(-\infty, -3) \cup (3, 5]$

Solution or Explanation

Click to View Solution

3. 3/3 points | Previous AnswersSCalc8 1.3.033.

Find the functions and their domains. (Enter the domains in interval notation.)

$f(x) = 9x + 2, \quad g(x) = x^2 + x$

(a) $f \circ g$

$$9x2+9x+2

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

$9x^2 + 9x + 2$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(b) $g \circ f$

$$81x2+45x+6

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

$81x^2 + 45x + 6$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(c) $f \circ f$

$$81x+20

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

$81x + 20$

$$(−∞,∞)

domain

$(-\infty, \infty)$

(d) $g \circ g$

$$x4+2x3+2x2+x

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

$x^4 + 2x^3 + 2x^2 + x$

$$(−∞,∞)

domain

$(-\infty, \infty)$

Solution or Explanation

$f(x) = 9x + 2; \quad g(x) = x^2 + x. \quad D = \mathbb{R}$ for both f and g, and hence for their composites.

(a) $(f \circ g)(x) = f(g(x)) = f(x^2 + x) = 9(x^2 + x) + 2 = 9x^2 + 9x + 2, D = \mathbb{R}$

(b) $(g \circ f)(x) = g(f(x)) = g(9x + 2) = (9x + 2)^2 + (9x + 2)$

$= 81x^2 + 36x + 4 + 9x + 2 = 81x^2 + 45x + 6, D = \mathbb{R}$

(c)

$(f \circ f)(x) = f(f(x)) = f(9x + 2) = 9(9x + 2) + 2 = 81x + 18 + 2 = 81x + 20$, $D = \mathbb{R}$

(d) $(g \circ g)(x) = g(g(x)) = g(x^2 + x) = (x^2 + x)^2 + (x^2 + x)$

$= x^4 + 2x^3 + x^2 + x^2 + x = x^4 + 2x^3 + 2x^2 + x$, $D = \mathbb{R}$

---

4. 2/2 points | Previous AnswersSCalc8 1.3.039.

Find $f \circ g \circ h$.

$f(x) = 5x - 2, \quad g(x) = \sin(x), \quad h(x) = x^2$

$$5sin(x2)−2

✔ $5 \sin(x^2) - 2$

Solution or Explanation

$(f \circ g \circ h)(x) = f(g(h(x))) = f(g(x^2)) = f(\sin(x^2)) = 5 \sin(x^2) - 2$

---

5. 2/2 points | Previous AnswersSCalc8 1.3.041.MI.

Find $f \circ g \circ h$.

$f(x) = \sqrt{x - 3}, \quad g(x) = x^2, \quad h(x) = x^3 + 4$

$$√(x3+4)2−3

✔ $\sqrt{(x^3 + 4)^2 - 3}$

Solution or Explanation

Click to View Solution

---

6. 2/2 points | Previous AnswersSCalc8 1.3.043.

Express the function in the form $f \circ g$. (Use non-identity functions for f and g.)

$F(x) = (2x + x^2)^4$

$\{f(x), g(x)\} = \{$

$$x4, 2x+x2

✔ $x^4, 2x + x^2$ }

Solution or Explanation

Let $g(x) = 2x + x^2$ and $f(x) = x^4$. Then $(f \circ g)(x) = f(g(x)) = f(2x + x^2) = (2x + x^2)^4 = F(x)$.

7. 2/2 points | Previous AnswersSCalc8 1.3.042.

Find $f \circ g \circ h$.

$$f(x) = \tan(x),\ g(x) = \frac{x}{x - 5},\ h(x) = \sqrt[3]{x}$$

$$tan(\sqrt[3]{x}\sqrt[3]{x}-5)

✔ $\tan\left(\frac{\sqrt[3]{x}}{\sqrt[3]{x} - 5}\right)$

Solution or Explanation
Click to View Solution

---

8. 2/2 points | Previous AnswersSCalc8 1.3.046.

Express the function in the form $f \circ g$. (Use non-identity functions for f and g.)

$$G(x) = \sqrt[3]{\frac{x}{1 + x}}$$

$\{f(x), g(x)\} = \{$

$$\sqrt[3]{x},x1+x

✔ $\sqrt[3]{x}, \frac{x}{1+x}\}$

Solution or Explanation
Click to View Solution

---

9. 2/2 points | Previous AnswersSCalc8 1.3.050.

Express the function in the form $f \circ g \circ h$. (Use non-identity functions for f, g, and h.)

$$H(x) = \sqrt[4]{4 + |x|}$$

$\{f(x), g(x), h(x)\} = \{$

$$\sqrt[4]{x},4+x,|x|

✔ $\sqrt[4]{x}, 4 + x, |x|\}$

Solution or Explanation
Click to View Solution

10.2/2 points | Previous AnswersSCalc8 1.3.052.

Use the table to evaluate each expression.

x	1	2	3	4	5	6
$f(x)$	3	4	2	2	6	1
$g(x)$	2	6	2	6	5	3

(a) $f(g(1))$

4 ✔ 4

(b) $g(f(1))$

2 ✔ 2

(c) $f(f(1))$

2 ✔ 2

(d) $g(g(1))$

6 ✔ 6

(e) $(g \circ f)(3)$

6 ✔ 6

(f) $(f \circ g)(6)$

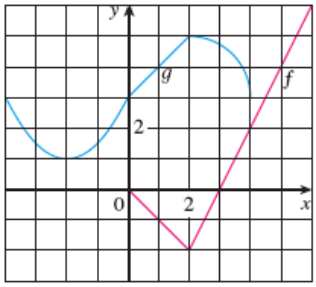
2 ✔ 2

Solution or Explanation

Click to View Solution

11.2/2 points | Previous AnswersSCalc8 1.3.053.

Use the given graphs of f and g to evaluate each expression, or if the expression is undefined, enter UNDEFINED.



(a) $f(g(2))$

4 ✔ 4

(b) $g(f(0))$

3 ✔ 3

(c) $(f \circ g)(0)$

0 ✔ 0

(d) $(g \circ f)(6)$

UNDEFINED ✔ UNDEFINED

(e) $(g \circ g)(-2)$

4 ✔ 4

(f) $(f \circ f)(4)$

-2 ✔ -2

Solution or Explanation

Click to View Solution

12. 2/2 points | Previous Answers SCalc8 1.3.056.MI.SA.

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

A spherical balloon is being inflated and the radius of the balloon is increasing at a rate of 7 cm/s.

Exercise (a)

Express the radius r of the balloon as a function of the time t (in seconds).

Step 1

The radius of the balloon can be written as a function of time, $r(t)$. We know the radius increases 7 cm each second. For example, after 2 seconds, the radius will be 14 cm, and after 3 seconds, the radius will be 21 ✓ 21 cm.

Step 2

$r(t) =$
$$7t

After t seconds, the radius will be ✓ $7t$.

Exercise (b)

If V is the volume of the balloon as a function of the radius, find $V \circ r$.

Step 1

The volume of a sphere is given by $V = \frac{4}{3}\pi r^3$. However, we found earlier that $r(t) = 7t$, and the composite function is therefore

$(V \circ r)(t) = V(r(t))$

$V($7
$$t
$=$ ✓ t)

$\frac{4}{3}\pi($
$$7t
$=$ ✓ $7t$ $)^3$.

Step 2

Therefore the final answer of:

$(V \circ r)(t) =$
$$1372nt33
✓ $\frac{4}{3}\pi(7t)^3$

is a composite function that gives volume (in cubic centimeters) ✓ volume (in cubic centimeters) as a function of time (in seconds) ✓ time (in seconds) .

You have now completed the Master It.

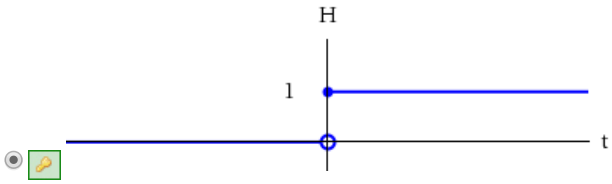
13.2/2 points | Previous AnswersSCalc8 1.3.059.

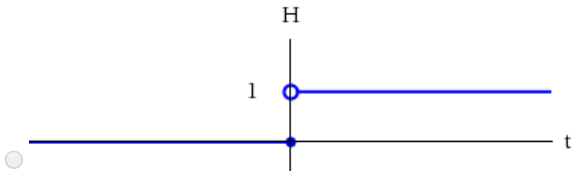
The **Heaviside function** H is defined by

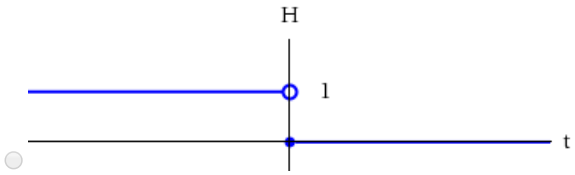
$$H(t) = \begin{cases} 0 & \text{if } t < 0 \\ 1 & \text{if } t \geq 0. \end{cases}$$

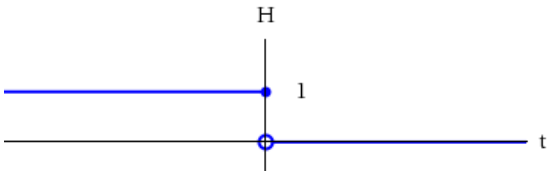
It is used in the study of electric circuits to represent the sudden surge of electric current, or voltage, when a switch is instantaneously turned on.

(a) Sketch the graph of the Heaviside function.

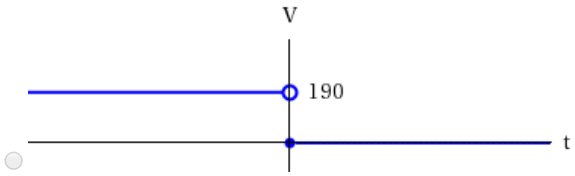


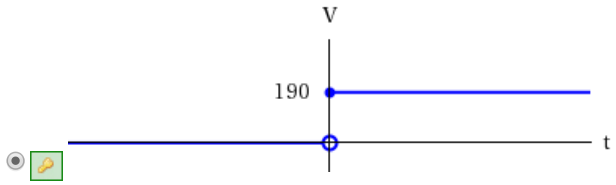


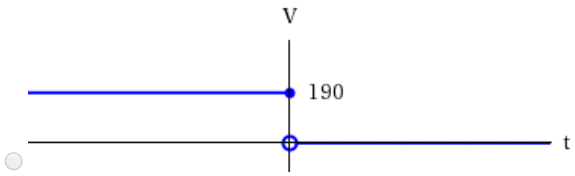


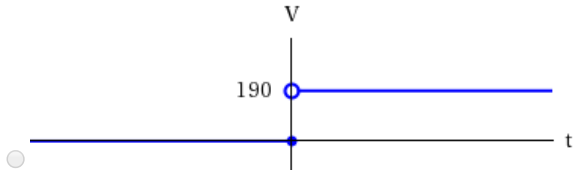


(b) Sketch the graph of the voltage $V(t)$ in a circuit if the switch is turned on at time $t = 0$ and 190 volts are applied instantaneously to the circuit.





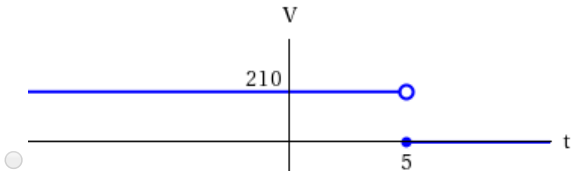


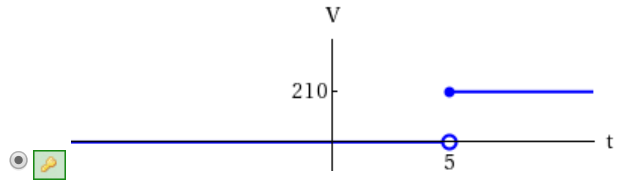


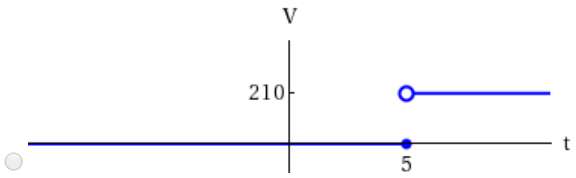
Write a formula for $V(t)$ in terms of $H(t)$.

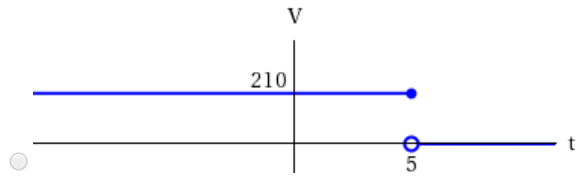
- $V(t) = H(t) - 190$
- $V(t) = H(t) + 190$
- $V(t) = \frac{H(t)}{190}$
- $V(t) = 190$
- $V(t) = 190H(t)$

(c) Sketch the graph of the voltage $V(t)$ in a circuit if the switch is turned on at time $t = 5$ seconds and 210 volts are applied instantaneously to the circuit.









Write a formula for $V(t)$ in terms of $H(t)$. (Note that starting at $t = 5$ corresponds to a translation.)

- $V(t) = 210H(t + 5)$
- $V(t) = 5H(t - 210)$
- $V(t) = 210H(t) - 5$
- $V(t) = 5H(t + 210)$
- ✓ $V(t) = 210H(t - 5)$

Solution or Explanation
Click to View Solution

---

14. 1/2 points | Previous AnswersSCalc8 1.3.061.

Let f and g be linear functions with equations $f(x) = m_1x + b_1$ and $g(x) = m_2x + b_2$. Is $f \circ g$ also a linear function?

- ✓ Yes
- No

If so, what is the slope of its graph? (If it is not, enter NONE).
$$m2x+b2

✗ $m_1 \cdot m_2$

Solution or Explanation
Click to View Solution

15.4/0 points | Previous AnswersSCalc8 1.3.037.

Find the functions and their domains. (Enter the domains in interval notation.)

$f(x) = x + \frac{1}{x}, \quad g(x) = \frac{x + 17}{x + 2}$

(a) $f \circ g$

$$2x2+38x+293(x+17)(x+2)$$

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

✔ $\frac{x+2}{x+17} + \frac{x+17}{x+2}$

$$(−∞,−17)∪(−17,−2)∪(−2,∞)$$

domain

✔ $(-\infty, -17) \cup (-17, -2) \cup (-2, \infty)$

(b) $g \circ f$

$$x2+17x+1(x+1)2$$

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

✔ $\frac{x^2 + 17x + 1}{x^2 + 2x + 1}$

$$(−∞,−1)∪(−1,0)∪(0,∞)$$

domain

✔ $(-\infty, -1) \cup (-1, 0) \cup (0, \infty)$

(c) $f \circ f$

$$x4+3x2+1x(x2+1)$$

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

✔ $x + \frac{1}{x} + \frac{x}{x^2 + 1}$

$$(−∞,0)∪(0,∞)$$

domain

✔ $(-\infty, 0) \cup (0, \infty)$

(d) $g \circ g$

$$6x+17x+7$$

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

✔ $\frac{6x + 17}{x + 7}$

$$(−∞,−7)∪(−7,−2)∪(−2,∞)$$

domain

✔ $(-\infty, -7) \cup (-7, -2) \cup (-2, \infty)$

Solution or Explanation

Click to View Solution