Module 5 Problem Set

Due Feb 14 by 9:59pm   **Points** 15   **Submitting** an external tool
Available Feb 7 at 10pm - Mar 20 at 9:59pm about 1 month

Review Assessment Attempts

Uber, Jacques

Module 5 Problem Set

Started: 2/8/21, 2:48 pm
Last Changed: 2/11/21, 12:53 pm
Total time questions were on-screen: 1077.3 minutes

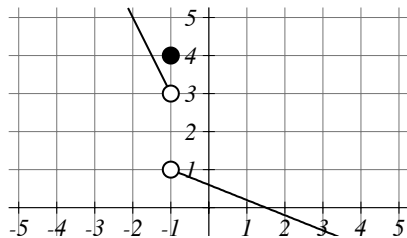Due Date: Sun 2/14/21, 9:59 pm

Score in Gradebook: 14.8/15

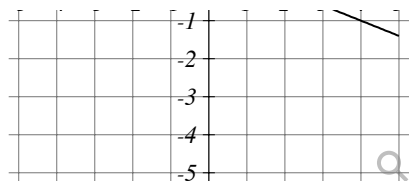Grade is calculated on the best version of each question

    Scored attempt. Score: **14.8/15**.

Question 1.   Version 2*/2. Score: **1/1** ▼

The graph below is the function $f(x)$

Find $\lim\limits_{x \to -1^-} f(x)$ | 3

Find $\lim\limits_{x \to -1^+} f(x)$ | 1

Find $\lim\limits_{x \to -1} f(x)$ | DNE

Find $f(-1)$ | 4

Score: 0.25/0.25 0.25/0.25 0.25/0.25 0.25/0.25
Time spent on this version: 0.3 minutes.
✉ Message instructor

Question 2.   Version 1*/1. Score: **1/1**

Find the following limit:

$$\lim_{x \to 9} \frac{x^3 - 10x^2 + 6x + 27}{x - 9}$$

Answer: 69

(The answer will be an integer or whole number)

Score: 1/1
Time spent on this version: 21.1 minutes.
✉ Message instructor

Question 3.   Version 3*/3. Score: **0.83/1** ▾

Let $f(x) = \begin{cases} -\frac{4}{x} & \text{if } x < 1 \\ -4 & \text{if } x = 1 \\ \frac{32}{x-9} & \text{if } x > 1 \end{cases}$

Compute the limits and determine the function value. Write "DNE" if the limit does not exist or the value is undefined.

$\lim\limits_{x \to 1^-} f(x) = \boxed{-4}$ ⚬

$\lim\limits_{x \to 1^+} f(x) = \boxed{-4}$ ⚬

$f(1) = \boxed{-4}$ ⚬

Since the above three quantities are [all defined and equal ▾] ✓ ⚬ , we know that f is

[continuous ▾] ✓ ⚬ at $x = 1$.

Is f continuous everywhere? If not, list all x-values for which f is discontinuous. Separate multiple answers with a comma. [DNE] ⚬

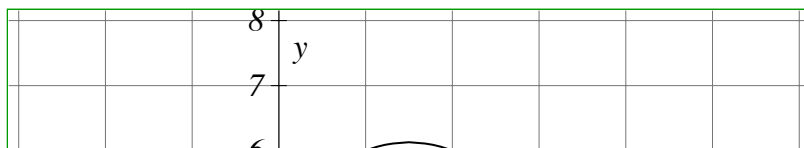Score: 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0/0.167
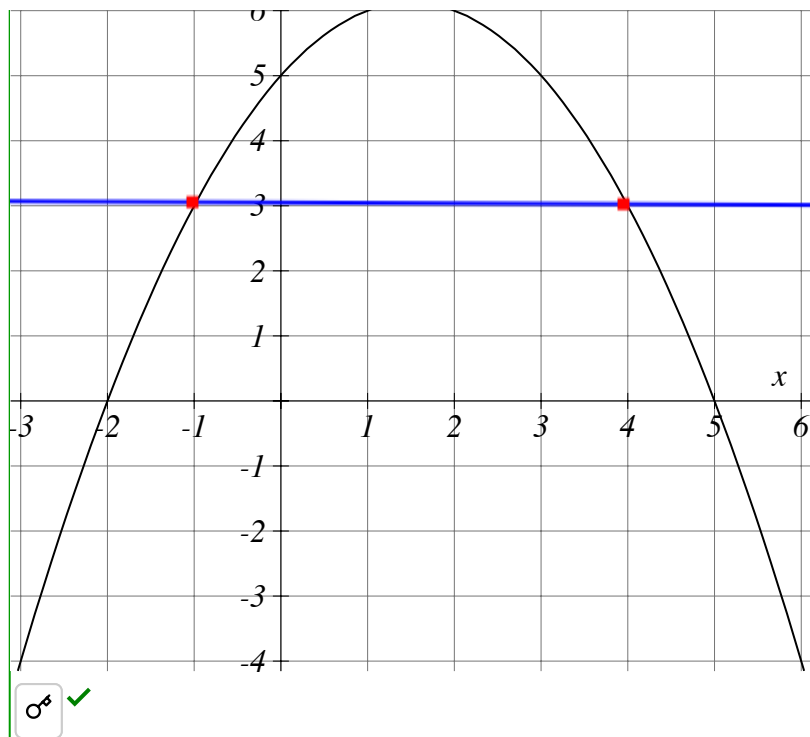Time spent on this version: 1.2 minutes.
✉ Message instructor

Question 4. | Version 1*/1. Score: **1/1** |

For the function shown below, draw the secant line from `x = -1` to `x = 4`.

Use the graph to estimate the average rate of change from `x = -1` to `x = 4`. (Round to three decimal places as needed.)

Average rate of change = 0

Score: 0.5/0.5 0.5/0.5
Time spent on this version: 16.9 minutes.
✉ Message instructor

Question 5.   Version 2*/2. Score: **1/1** ▼

A ball is thrown into the air with a velocity of 37 ft/s. Its height in feet after t seconds is given by ` y=37 t-16 t^(2) `.

A. Find the average velocity for the time period beginning when `t_1`=3 and lasting for the following number of seconds (round your answers to four decimals as needed):

.01 sec: -59.16 ⚷

.005 sec: -59.08 ⚷

.002 sec: -59.032 ⚷

.001 sec: -59.016 ⚷

Estimate the instanteneous velocity when t=3. -59 ⚷

Score: 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2
Time spent on this version: 1.5 minutes.
✉ Message instructor

Question 6.   Version 3*/3. Score: **1/1** ▾

An antibiotic is applied to a culture of bacteria. The number of bacteria cells remaining in the culture is given by `p(t) = 12000/(6 t^2+2)`, for `t ≥ 0` where `t` represents elapsed time in seconds.

Determine the rate of change with respect to time: `p'(t) =` ` $-\dfrac{36000t}{\left(3t^2+1\right)^2}$ ⚷

Determine the rate of change at `t = 3`: -137.755 ⚷   cells per second. (*Round your answer to 4 decimals as needed.*)

Choose the best answer:

○ The number of bacteria cells is always increasing and is approaching 12000.

◉ The number of bacteria cells is always decreasing and is approaching 0, but will never equal 0.

○ The number of bacteria cells is always decreasing and is approaching 12000.

○ The number of bacteria cells is always decreasing and will eventually equal 0.

⚷ ✔

Score: 0.333/0.333 0.333/0.333 0.333/0.333
Time spent on this version: 1.2 minutes.
✉ Message instructor

Question 7.   Version 3*/3. Score: **1/1** ▾

Winter Fun© has determined that the total revenue (in dollars) for its west coast factory from the sale of `x` Blazing Blue snowmobiles is given by

`R(x)=(1100 x)/\ln(6 x +6)`

Find the Marginal Revenue. Simplify as needed.

a) `R'(x) =`
$$\frac{-1100x + 1100(x+1)\ln(6x+6)}{(x+1)\ln(6x+6)^2}$$
⚬ ⚬

Find the Marginal Revenue when 125 Blazing Blue snowmobiles are produced.

b) `R'(125) =` | 141.12 | ⚬   Round to two decimals as needed.

Score: 0.333/0.333 0.333/0.333 0.333/0.333
Time spent on this version: 1.5 minutes.
✉ Message instructor

Question 8.   Version 2*/2. Score: **1/1** ▾

A swallow is sitting on a tree branch a certain height above the ground and decides to fly away. Its height (in meters) above the ground can be modeled by the function ` h(t) = - 2 t^2+ 6 t + 63`, where `t` is elapsed time in seconds after the swallow takes flight.

Find the height above the ground of the swallow before taking flight: | 63 | ⚬ `m`

Find the height above the ground of the swallow at `t=3.74` seconds: [57.46] ⚷ `m`

Find the initial velocity of the swallow: [6] ⚷ `m`/`s`

Find the velocity of the swallow at `t=3.74` seconds: [-8.96] ⚷ `m`/`s`

Find the initial acceleration of the swallow: [-4] ⚷ `m`/`s^2`

Find the acceleration of the swallow at `t=3.74` seconds: [-4] ⚷ `m`/`s^2`

Score: 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167
Time spent on this version: 2 minutes.
✉ Message instructor

Question 9.   [Version 2*/2. Score: **1/1** ▾]

The amount of funds available for a particular endowment fund (in thousands of dollars) after `t` years is given by:

`f(t)=e^(0.41t+9)`

Find the rate of change in the endowment fund after `5` years. $ [25807021.39] ⚷

Round your answer to two decimals as needed.

Score: 1/1
Time spent on this version: 1.3 minutes.
✉ Message instructor

Question 10.   [Version 1*/1. Score: **1/1**]

Use the chain rule to find the derivative of
`f(x)=``8(5x^5+4x^3)^(-1/2)`

`f'(x)=` $\dfrac{8\left(-12.5x^4 - 6.0x^2\right)}{\left(5x^5 + 4x^3\right)^{\frac{3}{2}}}$ ⚹

Score: 1/1
Time spent on this version: 9.6 minutes.
✉ Message instructor

Question 11.   Version 1*/1. Score: **1/1**

The labor costs to produce luxury yachts can be modeled by ` f(x) = (x^2+ 5 x + 3) ^ ( 2 )`, where `x` represents the number of yachts produced.

Find the marginal cost to produce `10` yachts $ | 7650 | ⚹
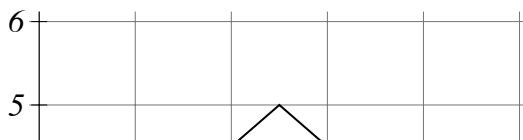
Find the marginal cost to produce `20` yachts $ | 45270 | ⚹
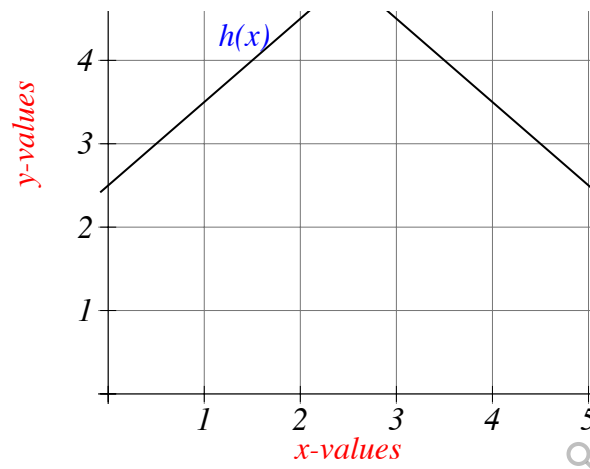
Score: 0.5/0.5 0.5/0.5
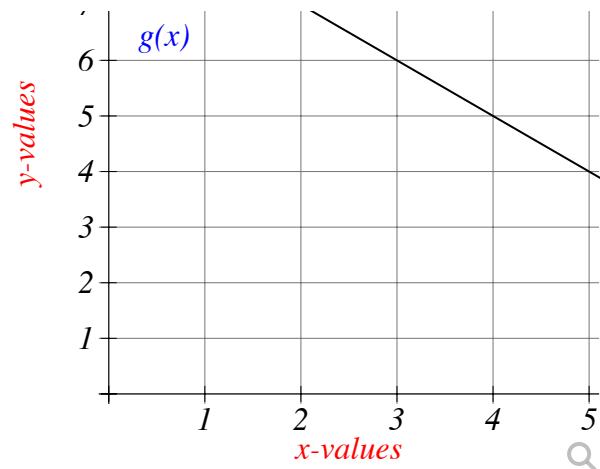Time spent on this version: 1.6 minutes.
✉ Message instructor

Question 12.   Version 3*/3. Score: **1/1** ▼

If `f(x) = g(h(x))`, then

`f'(4)` = [1] 🔑

Score: 1/1
Time spent on this version: 0.1 minutes.
✉ Message instructor

Question 13.   Version 1*/1. Score: **1/1**

Use the following table to answer the questions below.

`x`	1	2	3	4
`f(x)`	1	4	2	3
`f'(x)`	1	2	3	4
`g(x)`	4	2	1	3
`g'(x)`	2	3	1	4

Find `h'(3)` if `h(x)=f(x)*g(x)` [5] 🔑

Find `h'(3)` if `h(x)=f(x)/(g(x))` [1] 🔑   Round to 3 decimals as needed.

Find `h'(3)` if `h(x)=f(g(x))` | 1 | ⚬

Score: 0.333/0.333 0.333/0.333 0.333/0.333
Time spent on this version: 980.7 minutes.
✉ Message instructor

Question 14. | Version 1*/1. Score: **1/1** |

The number of per capita cumulative cases of COVID-19 in a particular country can be modeled by
`g(t)=ln(12 t^5)`, where `t` represents the number of days after the first `100` cases.

a) Find `g'(t)`.

`g'(t) = ` | $\dfrac{5}{t}$ | ⚬

b) Determine the rate of change in the number of cases after `163` days.

| 0.0307 | ⚬   cases per day. (Round your answer to 4 decimals)

Score: 0.5/0.5 0.5/0.5
Time spent on this version: 1.7 minutes.
✉ Message instructor

Question 15. | Version 1*/1. Score: **1/1** |

The depth (in feet) of water at a dock changes with the rise and fall of tides. The depth is modeled by the function

    `D(t) = 2 cos(pi/3 t + (2 pi)/3) + 5`

where t is the number of hours after midnight. Find the rate at which the depth is changing at 2 a.m.
Round your answer to 4 decimal places.

| 1.0100 | ⚬

1.8138

Score: 1/1
Time spent on this version: 2.2 minutes.
✉ Message instructor

Feedback:

Return to Gradebook