Week 2: Solve with instructor

Calculus

Let $f(x) = \begin{cases} \frac{\sqrt{9x^4+x^2}}{5x^2+3x+1} & , \text{if } x \leq 0; \\ x & , \text{if } x < 0. \end{cases}$. Is f continuous at $x = 0$?

Let $f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) + 3 & \text{, if } x \neq 0; \\ 1 & \text{, if } x = 0. \end{cases}$. Is f continuous at $x = 0$?

Let $f(x) = \begin{cases} -x + c & , \text{if } x \leq 1; \\ 6 - 2x^2 & , \text{if } x > 1. \end{cases}$ Find a value of c so that $f(x)$ is continuous at $x = 1$.

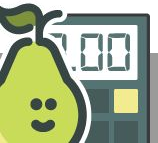
Let $f(x) = \begin{cases} \frac{x^2-9}{x-3} & , \text{if } x < 3; \\ cx^2 + 10 & , \text{if } x \geq 3. \end{cases}$ Find the value of c so that $f(x)$ is continuous at $x = 3$.

Students choose an option

Let $G(x) = \begin{cases} \frac{1}{(x+3)^2} & \text{, if } x \leq -1; \\ 2 - x & \text{, if } -1 < x \leq 1; \\ \frac{3}{x+2} & \text{, if } x > 1. \end{cases}$. Find all values of x where G is not continuous.

Students choose an option

What is the approximate value of $\sqrt{9.1}$ (up to four decimal places) ?



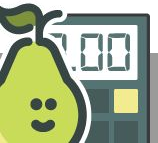
Students, enter a number!

Find the linearization of $\sqrt[3]{x}$ at $x = 8$?

Students, write your response!

Compute the linear approximation of $f(x) = (1+x)^n$ at $x=0$.

Use the linear approximation obtained in the previous question to compute an approximate value of (1.01)^3.



Students, enter a number!

Drag your dot to how you are feeling:

Keep going, I understand

I'm a little confused

Stop, I need help!

Students, drag the icon!

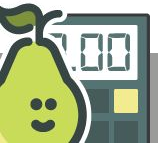
Compute the cubic approximation of $f(x) = \sqrt{(1+x)}$ at $a = 0$.

Students, write your response!

Find the linearization of $f(x) = e^x \sin(x - y)$ at the point (0, 0).

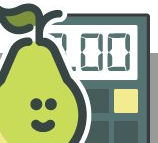
Students, write your response!

Compute the derivative of f(x, y) = x^2y in the direction of (1, 2) at the point (3, 2).



Students, enter a number!

For the function in the previous question (i. e., f(x, y) - x^2y), compute the derivative of f in the direction of (2, 1) at the same point, i. e., (3, 2).

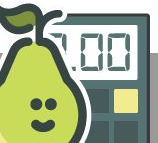


Students, enter a number!

For the function in the previous question (i. e., f(x, y) = x^2y), in which direction is the derivative maximum?

Students, write your response!

For the function in the previous question (i. e., f(x, y) = x^2y), what is the value of the maximal derivative?

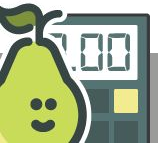


Students, enter a number!

For the function in the previous question (i. e., f(x) = x^2y), what is the derivative in the direction of (-3, 4) at the point (3, 2)?

Students, enter a number!

For the function in the previous question (i. e., f(x, y) = x^2y), what is the derivative in the direction of (-4, -3) at the point (3, 2)?



Students, enter a number!

Without computing, tell whether $x \cdot y = \| x \| \| y \|$ if x = [2, 5, 6] and y = [16, 40, 48].

Were you able to understand how to solve these questions?