Test 2

Take: 1 | 09/22/17

Directions:
Thinkwell Test 2 directions
BEFORE TAKING THE TEST:
1] From Thinkwell COURSE HOME tab, complete all of the preparation for chapters 3 Derivatives and 4 Computations following the syllabus or one-page course outline as soon as you can. Be sure to give yourself ample time so that you can take and submit the test in Thinkwell BEFORE the end of week 7.
2] Go to the Sakai Classroom, and click on the left tab ASSIGNMENTS and find 'Assignment 2'. Read the directions there.
You may just submit this assignment and I will do the calculations OR If you would like to calculate your grade, go to each Review section in Thinkwell while keeping a tally. Submit your answer as a 4 digit percent, for example 92.77%.
TO TAKE THE TEST:
3] From Thinkwell, click on ASSESSMENTS tab, and then click on 201 Test 2. Get a printout of the test to take with paper and pencil. Keep a log of all of your calculations as you may be required to submit a copy of your work for this test to count. I suggest double checking all answers on your calculator or via an alternate method before submitting.
4] Return to Thinkwell and record your answers on 201 Test 2, then submit it there.
AFTER TAKING THE TEST:
5] Return to our regular classroom in Sakai, click on left tab ASSIGNMENTS and find 'Test 2 Critique'. Follow the directions there and submit this BEFORE Wednesday 22:55 pm ET. The solution to your test in Thinkwell will be available on Monday following the test deadline so that you can better understand the errors that you made on the test.

Description:
25 questions due the END of week 7.
Assignment Critique Test 2 due Wednesday of week 8.

1)

What is the derivative of the function $f(x) = -\frac{5}{4}x^{-4/5}$?

- $x^{1/5}$
- $-x^{-9/5}$
- $\frac{25}{16}x^{-9/5}$
- $x^{-9/5}$

2)

Find the derivative of $f(x) = \frac{2}{3x}$.

- $f'(x) = \frac{-3}{2x^2}$
- $f'(x) = \frac{-2}{3x^2}$
- $f'(x) = \frac{2}{3x^2}$
- $f'(x) = \frac{3}{2x^2}$

3)

Compute the derivative of the function $f(x) = \left(5x^3 - 4x + \frac{1}{x}\right)^6$.

$6\left(5x^3 - 4x + \frac{1}{x}\right)^5 \left(15x^2 - 4 - x^{-2}\right)$

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$6\left(5x^3 - 4x + \frac{1}{x}\right)^5 \left(15x^2 - 4 + x^{-2}\right)$

4)

Suppose $f(x) = \left[x^2 - \left(1 + x^2\right)^2\right]^3$. Find $f'(x)$.

$f'(x) = -6x\left[x^2 - \left(1 + x^2\right)^2\right]^2 \cdot \left[1 + 2x^2\right]$

$f'(x) = -6\left[x^2 - \left(1 + x^2\right)^2\right]^2 \cdot \left[x^2 - x + 1\right]$

$f'(x) = 6\left[x^2 - \left(1 + x^2\right)^2\right]^2 \cdot \left[x^2 - x + 1\right]$

$f'(x) = 3\left[x^2 - \left(1 + x^2\right)^2\right]^2$

5)

Suppose $f(x) = x^{7/2}$. Find the equation of the line tangent to $f(x)$ at $\left(2, 8\sqrt{2}\right)$.

$y = \left(14\sqrt{2}\right)x - 36\sqrt{2}$

$y = \left(14\sqrt{2}\right)x - 20\sqrt{2}$

$y = \left(4\sqrt{2}\right)x - 16\sqrt{2}$

$y = \left(4\sqrt{2}\right)x$

6)

Given $y = \left(3x^2 + 7x\right)^3$, find $\frac{dy}{dx}$.

$\frac{dy}{dx} = 3\left(3x^2 + 7x\right)^2 (6x + 7)$

$\frac{dy}{dx} = 3\left(3x^2 + 7x\right)^2$

$\frac{dy}{dx} = 3\left(3x^2 + 7x\right)^2 (6x)$

$\frac{dy}{dx} = 3\left(3x^2 + 7x\right)^3 (6x + 7)$

7)

Consider the function $y = x^2 + x + 9$.
At what value of y is the slope of the tangent line equal to 5?

- 15
- -15
- 13
- -13

8)

A particle moves along a straight line with its position given by the function $p = f(t) = t^2 - 5t + 4$, where p is given in meters and t in seconds. When does the velocity equal 24 meters per second?

- $t = 1$
- $t = 12$
- $t = 14.5$
- $t = 4$

9)

Find the derivative.
$f(x) = x^{3.15}$

- Cannot be solved
- $f'(x) = x^{2.15}$
- $f'(x) = 3.15x^{2.15}$
- $f'(x) = 3.15x^{3.15}$

10)

An ant is crawling across a driveway. Its position is described by the position function $p(t) = \frac{1}{5}t + 2$, where t is in seconds and $p(t)$ is in feet. What is the ant's instantaneous velocity at $t = 1$?

- $\frac{1}{5}$ feet/second
- $2\frac{1}{5}$ feet/second
- -5 feet/second
- There is not enough information.

11)

Use two methods to compute the derivative of

$$f(x) = \frac{x^3 + x^2 - 1}{\sqrt{x}}.$$

12)

Given that the derivative of $\sqrt{x}$ is $\left(\sqrt{x}\right)' = \frac{1}{2\sqrt{x}}$, find the derivative of $f(x) = 2\sqrt{x}$.

- $f'(x) = \frac{0}{\sqrt{x}}$
- $f'(x) = \frac{2}{\sqrt{x}}$
- $f'(x) = \frac{1}{\sqrt{x}}$
- $f'(x) = \frac{1}{2\sqrt{x}}$
- None of the above

13)

What is the average rate of change of the function $y = x^2 - 5x + 3$ between $x = x_1$ and x_2?

- $x_1 + x_2 - 5$
- $\frac{6}{x_2 - x_1}$
- $\frac{x_2^2 - x_1^2 + 6}{x_2 - x_1}$
- $\frac{x_2^2 - x_1^2 - 5x_2 - 5x_1 + 6}{x_2 - x_1}$

14)

Find the derivative.
$f(x) = \frac{x^2 + 1}{x + 1}$

- $f'(x) = \left(x^2 + 1\right) - (x + 1)(2x)$
- $f'(x) = \left(x^2 + 1\right) + (x + 1)(2x)$
- $f'(x) = \frac{(x + 1)(2x) - \left(x^2 + 1\right)}{(x + 1)^2}$
- $f'(x) = \frac{(x + 1)(2x) + \left(x^2 + 1\right)}{(x + 1)^2}$

15)

Given that $f(x) = \sqrt{6x-3}$, evaluate $f'(x)$.

- $\frac{3}{\sqrt{6x-3}}$
- $\frac{6}{\sqrt{6x-3}}$
- $-\frac{6}{\sqrt{6x-3}}$
- $-\frac{3}{\sqrt{6x-3}}$

16)

Assume that the population of the United States is always increasing and that it is described by the function $P(t) = \frac{1}{5255} \cdot 2^t + 2 \times 10^8$, where t is the year. What can you conclude about $P'(1999)$?

- $P'(1999) \approx 153.2$
- $P'(1999) < 0$
- $P'(1999) > 0$
- Nothing can be concluded about $P'(1999)$.
- None of the above

17)

Suppose $f(x) = x^{\frac{1}{2}}$. What is $f'(x)$?

- $f'(x) = \frac{1}{2x}$
- $f'(x) = \frac{x}{2}$
- $f'(x) = \frac{\sqrt{x}}{2}$
- $f'(x) = \frac{\sqrt{x}}{2x}$

18)

If $g(x) = 3x^2 + x$, simplify the expression $\frac{g(-2+\Delta x) - g(-2)}{\Delta x}$.

- $\frac{-4 - 9\Delta x + 3(\Delta x)^2}{\Delta x}$
- $-11 + 3\Delta x,\ \Delta x \neq 0$
- -11
- $\frac{-4 - 11\Delta x + 3(\Delta x)^2}{\Delta x}$

19)

Find the derivative.

$$f(x) = \frac{(3x^2 + 7x)^4}{(2x^3 - 6x)^3}$$

$$f'(x) = \frac{4(2x^3 - 6x)^3 (3x^2 + 7x)^3 (6x + 7)}{(2x^3 - 6x)^6} + \frac{3(3x^2 + 7x)^4 (2x^3 - 6x)^2 (6x^2 - 6)}{(2x^3 - 6x)^6}$$

$$f'(x) = 4(2x^3 - 6x)^3 (3x^2 + 7x)^3 (6x + 7) - 3(3x^2 + 7x)^4 (2x^3 - 6x)^2 (6x^2 - 6)$$

$$f'(x) = \frac{3(3x^2 + 7x)^4 (2x^3 - 6x)^2 (6x^2 - 6)}{(2x^3 - 6x)^6} - \frac{4(2x^3 - 6x)^3 (3x^2 + 7x)^3 (6x + 7)}{(2x^3 - 6x)^6}$$

20)

Consider the function $f(x) = x^2 - x$. Using the fact that $f'(x) = 2x - 1$, find the point (x, y) on the graph of $f(x)$ where the tangent line is a horizontal line.

$(-1, 2)$

$(0, 0)$

21)

22)

23)

Using the definition of the derivative, calculate the derivative of the function $g(x) = -4x + 2$.

- The derivative does not exist.

24)

- 6.7
- 4.1
- 6.2
- There is not enough information.

25)

Is the function $f(x) = 3x^2 - 27$ differentiable on the open interval (2, 4)?

- Yes, the function is differentiable on this interval.
- No, the function is not differentiable on this interval.