Calculus Online Assignment 2

Click on a question number to see how your answers were marked and, where available, full solutions.

Question Number	Score		
Question 1	5	/	5
Question 2	5	/	5
Question 3	5	/	5
Question 4	4	/	4
Total	19	/	19 (100%)

Performance Summary

Exam Name:	Calculus Online Assignment 2
Session ID:	0792037771
Student's Name:	Debnath, Tanmoy (scone_prod.qzdPpmsTBh7wbv04ck5kOAKFEZqXTSdwoZzwy5DF:canvas-lms.76420)
Exam Start:	Fri Nov 19 2021 14:29:09
Exam Stop:	Fri Nov 19 2021 14:44:22
Time Spent:	0:09:45

Question 1

Recall the rule, valid at least for integer powers n,

$$\frac{d}{dx}x^n = nx^{n-1}.$$

a)

Find the derivative of the function $f(x) = -x^3 - x^2 + 1$.

$f'(x) =$ `-3x^2-2x` $-3x^2 - 2x$ ✔

✔ Your answer is numerically correct. You were awarded **2** marks.

You scored **2** marks for this part.

Score: 2/2 ✔

b)

Find the slope of the tangent line to the graph of f at the point $(2, -11)$.

Slope =   `-16` -16 ✔

Find the equation of the tangent line to the graph of f at the point $(2, -11)$.

Equation of tangent line is $y = mx + c$ where $m =$ `-16`   ✔ and $c =$ `21` ✔

Gap 0

✔ Your answer is numerically correct. You were awarded **1** mark.

Gap 1

✔ Your answer is correct. You were awarded **1** mark.

Gap 2

✔ Your answer is correct. You were awarded **1** mark.

You scored **3** marks for this part.

Score: 3/3 ✔

Question 2

The Product Rule for differentiation states that

$$\frac{d}{dx}\left(f(x) \times g(x)\right) = f(x) \times g'(x) + g(x) \times f'(x).$$

[Input powers as "x^(10)", say, and trigonometric functions as "sin(x)", "cos(x)".]

Find the derivative of the function

$h(x) = (9x^2 - 4)\sin x.$

$h'(x) =$

(9x^2 - 4)cos(x) + 18x*sin(x)

$\left(9x^2 - 4\right)\cos(x) + 18x\sin(x)$ ✔

Expected answer: (9*x^2 - 4)*cos(x) + 18x*sin(x)

$\left(9x^2 - 4\right)\cos(x) + 18x\sin(x)$

✔   Your answer is numerically correct. You were awarded **5** marks.

You scored **5** marks for this part.

Score: 5/5 ✔

Question 3

The Quotient Rule for differentiation states that

$$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)f'(x) - f(x)g'(x)}{g(x)^2}$$

Find the derivative of the function

$$h(x) = \frac{3x^7 - 1}{6x^6 - 2}.$$

$h'(x) =$

$$\boxed{\texttt{(((6x\^{}6 - 2)(21x\^{}6)) - (3x\^{}7 -1)(36x\^{}5))/ (6x\^{}6-2)\^{}2}}$$

$$\frac{\left(6x^6 - 2\right) \times 21x^6 - \left(3x^7 - 1\right) \times 36x^5}{\left(6x^6 - 2\right)^2} \quad \checkmark$$

✔ Your answer is numerically correct. You were awarded **5** marks.

You scored **5** marks for this part.

Score: 5/5 ✔

Question 4

The Chain Rule for differentiation is used to compute the derivative of a composition of functions. It states that

$$\frac{d}{dx}\left((f \circ g)(x)\right) = f'\left(g(x)\right) \times g'(x).$$

Set $h(x) = \sin\left(6x^4 + 4\right)$.

Write $h(x)$ as the composition of functions $(f \circ g)(x)$ where

$g(x) = \boxed{\texttt{6x\^{}4 + 4}} \quad 6x^4 + 4 \quad \checkmark$ and $f(x) =$

$\boxed{\texttt{sin(x)}} \quad \sin(x) \quad \checkmark$

Compute the derivative of h:

$h'(x) = \boxed{\texttt{(24x\^{}3)cos(6x\^{}4+4)}} \quad 24x^3 \cos\left(6x^4 + 4\right) \quad \checkmark$

Gap 0

✔ Your answer is numerically correct. You were awarded **1** mark.

Gap 1

✔ Your answer is numerically correct. You were awarded **1** mark.

Gap 2

✔ Your answer is numerically correct. You were awarded **2** marks.

You scored **4** marks for this part.

Score: 4/4 ✔

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