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:	14167224811
Student's Name:	Debnath, Tanmoy (scone_prod.qzdPpmsTBh7wbv04ck5kOAKFEZqXTSdwoZzwy5DF:canvas-lms.76420)
Exam Start:	Thu Nov 18 2021 14:41:07
Exam Stop:	Thu Nov 18 2021 14:52:46
Time Spent:	0:11:38

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 $f(x) = 3x^2 - 3x^3 + 3$.

$f'(x) =$ 6x - 9x^2 $6x - 9x^2$ ✔

✔ 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 $(3, -51)$.

Slope = -63 -63 ✔

Find the equation of the tangent line to the graph of f at the point $(3, -51)$.

Equation of tangent line is $y = mx + c$ where $m =$ -63 ✔ and $c =$ 138 ✔

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

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

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

Find the derivative of the function

$h(x) = (8x^2 - 3)\sin x.$

$h'(x) =$

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(8x^2 - 3)(cos(x)) + 16x*sin(x)
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$\big(8x^2 - 3\big)\cos(x) + 16x\sin(x)$ ✔

Expected answer: `(8*x^2 - 3)*cos(x) + 16x*sin(x)`

$\big(8x^2 - 3\big)\cos(x) + 16x\sin(x)$

✔ 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

$$h(x) = \frac{5x^{10} + 2}{6x^3 + 2}.$$

$h'(x) =$

((6x^3 + 2)(50x^9)-(5x^10+2)(18x^2))/(6x^3 + 2)^2

$$\frac{\left(6x^3+2\right)\times 50x^9-\left(5x^{10}+2\right)\times 18x^2}{\left(6x^3+2\right)^2}$$ ✔

✔ 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

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

Set $h(x) = \sin\left(10x^6+7\right)$.

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

$g(x) =$ 10x^6 + 7 $10x^6+7$ ✔ and $f(x) =$ sin(x) $\sin(x)$ ✔

Compute the derivative of h:

$h'(x) =$ cos(10x^6 + 7)*(60x^5) $\cos\left(10x^6+7\right)\times 60x^5$ ✔

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 ✔
