

Calculus Honors

Homework-3 Q2

Studyguide

Exercise 2.

Let f and g be differentiable functions and c a real number. Determine whether the following statements are true or false.

1. $(cf(x))' = cf'(x)$.
2. $(f(x) + g(x))' = f'(x) + g'(x)$.
3. $(f(x) - g(x))' = f'(x) - g'(x)$.
4. $(f(x)g(x))' = f'(x)g'(x)$.
5. $\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) + g'(x)f(x)}{g^2(x)}$.
6. If $f(x) = x^2 - x$, $f'(1) = f(1)'$.
7. $\left(\frac{1}{x}\right)' = \ln x$.
8. $(\sin x)' = \cos x$.
9. $(e^x)' = e^x$.

Exercise 2.

Let $f(x) = x^2 - 2x + \sqrt{x}$,

1. Find the derivative $f'(x)$.
2. Find the second derivative $f''(x)$.
3.
 - (i) Calculate the $f'(4)$.
 - (ii) Calculate the $f(2)'$.
 - (iii) Calculate the $f''(1)$.

Exercise 3.

Find the derivatives of the following functions.

1. $(x^{12} - 2x^6 + 3x^4 - 2x^6 + 12)' =$

2. $(x^{\frac{5}{2}}\sqrt{x} + x - 1)' =$

3. $(\sin x \cos x)' =$

4. $\left(\frac{\sin x}{\cos x}\right)' =$

5. $\left(\frac{-2}{x^2}\right)' =$

6. $\left(\frac{e^x}{x}\right)' =$

7. $(xe^x)' =$

8. $\left(\frac{1}{e^x}\right)' =$

9. $\left(\frac{x-1}{x+1}\right)' =$

10. $\left(\frac{e^x-1}{e^x+1}\right)' =$

11. $((x+1)\ln x)' =$

12. $\left(\frac{\ln x}{x}\right)' =$