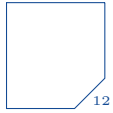


FORENAME: SURNAME: STUDENT NO: **DEADLINE: Friday 20 December 2019, 4:50pm****Exercise 36** (The Chain Rule).(a). Differentiate $f(x) = (3x^2 + 5)^5$.(b). Differentiate $g(x) = \cos(x^3 - 6x + 10)$.(c). Differentiate $h(x) = \frac{1}{(2x - 5)^3}$.**Exercise 37** (Indefinite Integrals). Find the following indefinite integrals. The first one is done for you.

$$(\omega) \int 2x \, dx.$$

$$\text{solution: } \int 2x \, dx = x^2 + C.$$

$$(a) \int \left(\frac{x^2}{2} + 4x^3 \right) dx.$$

$$(b) \int \frac{t+1}{t^3} dt.$$

$$(c) \int \left(\frac{1 - \cos 6\theta}{2} \right) d\theta.$$

Exercise 38 (Right or Wrong?). Consider

$$\int (\sin x + 3x^2 - 2x + 7) dx = \cos x + x^3 - x^2 + 7x + C.$$

Is this correct or incorrect? Why?

Exercise 39 (Definite Integrals). Find the following definite integrals. The first one is done for you.

(ω) $\int_{-2}^0 (2x + 5) dx$. *solution:* $\int_{-2}^0 (2x + 5) dx = [x^2 + 5x]_{-2}^0 = (0^2 + 0) - ((-2)^2 + 5(-2)) = 0 - (4 - 10) = 6.$

(a) $\int_{-1}^1 (x^2 - 2x + 3) dx$.

(b) $\int_{-\sqrt{3}}^{\sqrt{3}} (t + 1)(t^2 + 4) dt$.

(c) $\int_0^{\pi} \frac{1}{2} (\cos x + |\cos x|) dx$.

Exercise 40 (Derivatives). Use the Fundamental Theorem of Calculus to find $\frac{dy}{dx}$ if $y = \int_2^{x^2} \sin(t^3) dt$.