FORENAME:

SURNAME:

STUDENT NO:

12

2019–20 **MATH117 Mathematics for Architects – Homework 8 (Calculus)** N. Course

**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 $h(x) = \dfrac{1}{(2x-5)^3}$.

**Exercise 37** (Indefinite Integrals)**.** Find the following indefinite integrals. The first one is done for you.

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

*solution:* $\int 2x\ dx = x^2 + C.$

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

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

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

**Exercise 38** (Right or Wrong?)**.** Consider

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

Is this correct or incorrect? Why?

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

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

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

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

(c) $\displaystyle\int_{0}^{\pi} \frac{1}{2}\left(\cos x + |\cos x|\right)\ dx.$

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

I declare that this assignment is entirely my own work. I did not copy from another student and I did not allow anyone to copy from me. *Bu ödevin tamamen kendi çalışmamın ürünü olduğunu, başka bir öğrencinin ödevini kopyalamadığımı; başkasının da benim çalışmamı kopyalamasına izin vermediğimi beyan ederim.*

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