FORENAME:

SURNAME:

STUDENT NO:

12

2018–19 Autumn **MATH115 Basic Mathematics – Homework 5** N. Course

DEADLINE: Tuesday 27 November 2018, 3pm

Exercise 21 (Definite Integrals). Find the following definite integrals. The first one is done for you.

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

(a) Find $\displaystyle\int_{0}^{\pi} (1+\cos x)\,dx.$

(b) Find $\displaystyle\int_{-3}^{-1} \frac{y^5-2y}{y^3}\,dy.$

(c) Find $\displaystyle\int_{1}^{2} \left(t^2+\sqrt{t}\right)\,dt.$

Exercise 22 (Derivatives). Use the Fundamental Theorem of Calculus to find $\dfrac{dy}{dx}$ if $y = \displaystyle\int_{\tan x}^{0} \frac{1}{1+t^2}\,dt.$

[HINT: $1+\tan^2\theta = \sec^2\theta$.]

Exercise 23 (The Substitution Method for Indefinite Integrals). Use a substitution to evaluate the following indefinite integrals. You must show your working.

(a) $\displaystyle\int \frac{1}{\sqrt{5x+8}}\,dx.$

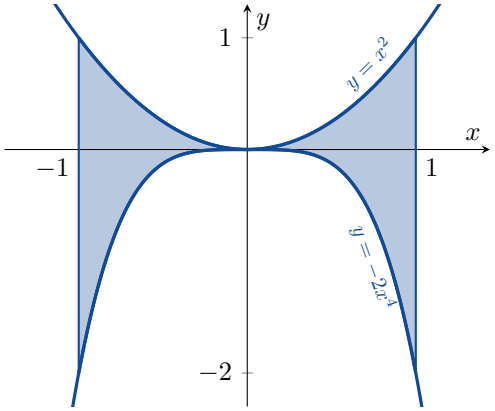
(b) $\displaystyle\int \tan^7\frac{x}{2}\sec^2\frac{x}{2}\,dx.$

Exercise 24 (The Substitution Method for Definite Integrals). Use a substitution to evaluate the following definite integrals. You must show your working.

(a) $\displaystyle\int_{2\pi}^{3\pi} 3\left(\cos^2 x\right)(\sin x)\;dx.$

(b) $\displaystyle\int_1^4 \frac{1}{2\sqrt{y}(1+\sqrt{y})^2}\,dy.$

Exercise 25 (Area Between Curves). Calculate the area between the curve $y = x^2$ and the curve $y = -2x^4$ for $-1 \le x \le 1$.



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