

New Higher Homework 8

Section 1: Integration

1. Evaluate (a) $\int \frac{u^2 + 2}{2u^2} du$ (b) $\int \frac{3x^2 + 1}{\sqrt{x}} dx$ (c) $\int \left(x + \frac{1}{x}\right)^2 dx$
2. Evaluate (a) $\int_1^2 6x^2 dx$ (b) $\int_1^3 \frac{dx}{x^2}$ (c) $\int_{-1}^1 (4x^3 + 3x^2) dx$

Section 2: Trigonometry

1. Solve each of these equations:
(a) $4\cos 2x^\circ - 3 = 0$ ($0 < x < 360$) (b) $\sin^2 x = \frac{1}{2}$ ($0 < x < 2\pi$)
2. Prove that (a) $3\cos^2 A - 2 = 1 - 3\sin^2 A$ (b) $\frac{\sin A}{\cos A} + \frac{\cos A}{\sin A} = \frac{1}{\cos A \sin A}$
3. Solve these equations for $0 \leq x \leq 360$:
(a) $2\cos^2 x^\circ - \cos x^\circ = 0$ (b) $3\sin^2 x^\circ + 2\sin x^\circ - 1 = 0$.
4. $\sin A = \frac{2}{3}$ and A is acute. Find the exact values of a) $\sin 2A$ b) $\cos 2A$
5. Prove that $\cos(\alpha - \beta) - \cos(\alpha + \beta) = 2\sin \alpha \sin \beta$
6. $\sin A = \frac{3}{5}$ and $\sin B = \frac{7}{25}$, where A and B are acute angles.
(a) Find the exact values of $\cos A$ and $\cos B$.
(b) Show that $\cos(A + B) = \frac{3}{5}$.
(c) Find the exact values of $\cos 2A$ and $\sin 2A$.
(d) Find the exact value of $\sin(2A + B)$.