



Ross High School: Mathematics Department

Higher Mathematics: Homework 20

1. Given $\tan x = \frac{4}{3}$ and $\tan y = \frac{5}{12}$, where x and y are acute angles, find the exact values of:
- a) $\sin(x - y)$ (4)
- b) $\sin 2x$ (2)
2. Solve the equation $\sin 2x = \cos x$ in the interval $0 \leq x \leq 2\pi$. (4)
3. a) Show that $2 \cos 2x - \cos^2 x = 1 - 3 \sin^2 x$. (2)
- b) Hence, solve the equation $2 \cos 2x - \cos^2 x = 2 \sin x$ in the interval $0 \leq x \leq 360$. (4)
4. If $y = \frac{1}{x^3} - \cos 3x$, $x \neq 0$, find $\frac{dy}{dx}$. (3)