



Ross High School: Mathematics Department

Higher Mathematics: Homework 21

1. Express $\sin x - \sqrt{3} \cos x$ in the form $k \sin(x - a)$ where $k > 0$ and $(0 \leq a \leq 2\pi)$. (6)

2. Part of the graph $y = 2 \sin x + 5 \cos x$ is shown in the diagram below.

a) Express $y = 2 \sin x + 5 \cos x$ in the form $k \sin(x + a)^\circ$ where $k > 0$ and $0^\circ \leq a^\circ \leq 360^\circ$. (6)

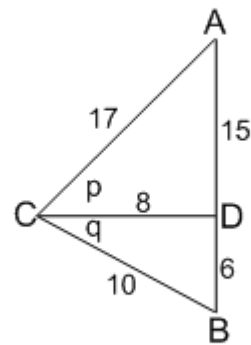
3. Triangles ACD and BCD are right-angled at D with angles p & q and lengths as shown in the diagram

a) Show that the exact value of $\sin(p + q)$ is $\frac{84}{85}$. (3)

b) Calculate the exact values of:

(i) $\cos(p + q)$

(ii) $\tan(p + q)$



4. With reference to a suitable set of coordinate axes, A, B and C are the points $(-8, 10, 20)$, $(-2, 1, 8)$ and $(0, -2, 4)$ respectively.

Show that A, B and C are collinear and find the ratio AB : BC (4)