The Wave Function

1. [T4] (a) Write $2sinx° + 3cosx°$ in the form $ksin(x + a)°$, where $k > 0$ and $0 < a < 360$.
(b) Hence, state the maximum value of $y = 2sinx° + 3cosx°$ and determine the value of x where it occurs.

2. [T4] (a) Write $2cos\theta° + \sqrt{5}sin\theta°$ in the form $kcos(\theta + \beta)°$, where $k > 0$ and $0 < \beta < 360$.
(b) Hence, state the minimum value of $y = 2cos\theta° + \sqrt{5}sin\theta°$ and determine the value of θ where it occurs.

3. [T4, T1] (a) Write $f(x) = sinx° - \sqrt{7}cosx°$ in the form $ksin(x - a)°$
(b) Hence, solve $f(x) = 2$ in the interval $0 \leq x \leq 360°$.

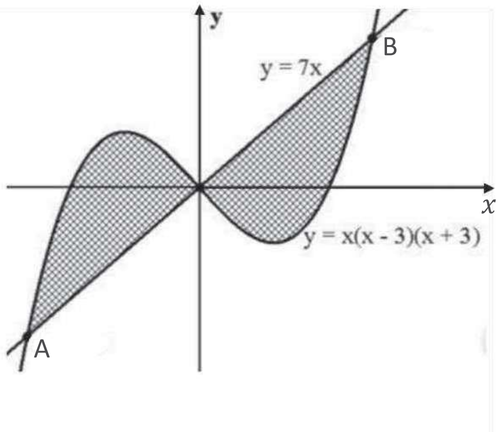
4. [T4, T1] Solve $6 \cdot 5 - 5cosx - 12sinx = 0$, where $0 \leq x \leq 2\pi$.

Integration

1. [C9] Find $\int \frac{6x^3-1}{x^2} dx$

2. [C15] Evaluate $\int_1^3 x(9x + 2)dx$

3. [C17] The diagram shows the curve $y = x(x - 3)(x + 3)$ and the line $y = 7x$.



The curves intersect at the origin and the points shown.

(a) Find the coordinates of A and B.

(b) Calculate the shaded area.

4. [C14] The curve $y = f(x)$ is such that $\frac{dy}{dx} = 6x^2 - 5$.

The curve passes through the point (2, 7).

Express y in terms of x.