Springburn Academy : Mathematics Department

Higher Mathematics : Lesson Starters

Block 3 (Wave Equation 1)

Without using a calculator :

Task 1

1 Write $x^2 - 6x + 19$ in the form $(x + a)^2 + b$

2 Find the distance between (0,0) and (-6, 8).

3 Write down the exact value of $4\sin\frac{\pi}{3} - 3\cos\frac{\pi}{6}$

4 Expand Cos(A+B)

Task 2

1 Factorise $3x^2 - 2x - 8$

2 What is the gradient of $5x + 4y - 9 = 0$?

3 Write down the exact value of $3\tan\frac{\pi}{6}$

4 Expand and simplify $\text{Sin}(x - 30)°$

Task 3

1 What is the min. value of $(5x - 4)^2 + 3$?

2 What is the gradient of $x + 6y = 2$?

3 Write down the exact value of $\sin\frac{\pi}{6} + \cos\frac{\pi}{3}$

4 Express Cos $x°$ – Sin $x°$ in the form $k\,\text{Cos}(x+a)°$, $0° \leq a° \leq 360°$.

Task 4

1 If $f(x) = \sqrt{x}(5 - x^3)$, find $f'(x)$.

2 Factorise $x^3 - 6x^2 + 5x$ fully.

3 Write down the exact value of $4\sin\frac{\pi}{4}$

4 Express Cos x + $\sqrt{3}$ Sin x in the form $k\,\text{Sin}(x - a)$, $0 \leq a \leq 2\pi$.

Task 5

1 Write $\cos^2 x$ in terms of $\cos 2x$.

Hence find $\int 4\cos^2 x \, dx$.

2 Express $4\cos x^\circ - 7\sin x^\circ$ in the form $k\sin(x-a)^\circ$, where $k > 0$ and $0 \le a < 360$.

Hence solve $4\cos x^\circ = 7\sin x^\circ + 3$ for $0 \le x < 360$.