

Springburn Academy : Mathematics Department

Higher Mathematics : Lesson Starters

Block 3 (Trig Equations 1)

Without using a calculator :

Task 1

- 1 Convert $\frac{\pi}{4}$ to degree measure.
- 2 What is the exact value of $\cos 30^\circ$?
- 3 Find the gradient of the line perpendicular to
 $3y + 2x - 5 = 0$
- 4 Write down the equation of the circle Centre $(7, -3)$, Radius 8

Task 2

- 1 Given that $x - 1$ is a factor of $x^3 - 6x^2 + px - 6$, find the value of p .
- 2 The line with equation $kx - 2y + 9 = 0$ is parallel to the line with gradient 7.

What is the value of k ?

- 3 The vectors \mathbf{p} and \mathbf{q} with components $\mathbf{p} = \begin{pmatrix} 1 \\ k \\ 2 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} k \\ -3 \\ -2 \end{pmatrix}$ are perpendicular.

What is the value of k ?

- 4 Write down the formula for $\cos(M - N)$

Task 3

- 1 Expand and simplify $\cos(30 - X)^\circ$.

- 2 If $h(x) = \frac{4}{x^2 - 2x - 8}$.

For what values of x is $h(x)$ undefined?

- 3 K and L are the points with coordinates $(0, -1, 4)$ and $(3, -2, 5)$ respectively.

If $\overline{KM} = 3\overline{KL}$, find the coordinates of M.

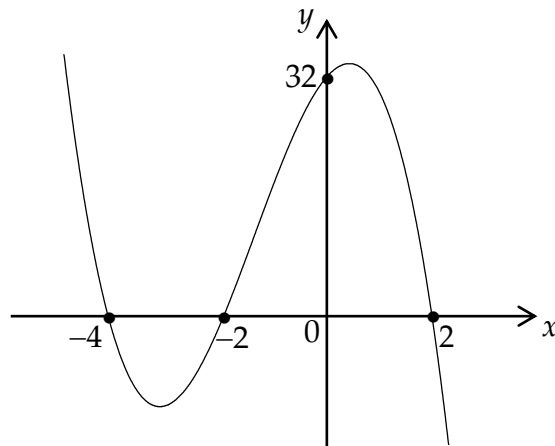
- 4 The answer is 1. What is the question?

Task 4

- 1 Given that $\log_2 \frac{1}{8} = p$, find the value of p .
- 2 A sequence is generated by the recurrence relation $u_{n+1} = 0.8u_n + 16$.
What is the limit of this sequence as $n \rightarrow \infty$?
- 3 Find $\int \frac{1}{2x^4} dx$.
- 4 Using $75^\circ = 45^\circ + 30^\circ$, find the exact value of $\cos 75^\circ$.

Task 5

- 1 The diagram shows part of the graph of a cubic.



What is the equation of this graph?

- 2 If $\sin A = \frac{3}{5}$ and $\cos B = \frac{1}{2}$

Calculate the exact value of $\sin(A - B)$.