# Y12: EXCELLENCE LEVEL B

## ALGEBRA.

1. Find the value of the constant "c" so that the line $y = 3x + c$ is a tangent to the curve $y = \frac{-12}{x}$

2. A Biological researcher found that the number of bacteria in a culture could be calculated at some future time using a formula of the form $N = A \times b^t$
Where $N$ = the number of bacteria at $t$ hours. $A$ and $b$ are unknown constants.
She estimated that at ***t = 4 hours, N was 5,600 and at t = 7 hours, N was 59,700.***
Use this information to calculate the constants $A$ and $b$ then use your formula to estimate the number of bacteria at $t = 12$ hours.

## CALCULUS

2. A 40 cm piece of wire is cut into two pieces.
The first piece is shaped into a circle of area A , and the second piece into a square of area B.
Find the minimum value of the total area A + B.