

ITEM ON INDICIES, SURDS AND LOGARITHM

SCENARIO

There has been a scout's camp at your school and one of the activities is treasure hunt.

To find the treasure, the scouts are required to solve the following statements in order to generate a **4 digit passcode key** to open the treasure box;

- $2^{2x} + 2 = 3 \times 2^x \dots \dots \dots$ **Statement one**
- $\frac{3\sqrt{2}-2\sqrt{3}}{3\sqrt{2}+2\sqrt{3}} \dots \dots \dots$ **Statement two**

Rules of the game:

1. Solving for values of x in statement one generates the first two digits of the passcode with the **least number** in the solution in **position one**.
2. Expressing the second equation in the form of $a - b\sqrt{c}$ generates the **third digit as value of a** and **fourth digit as value of b**.

Assuming you manage to open the treasure box and you find the following note;

“If $\log_a n = x$ and $\log_c n = y$ prove that $\frac{x-y}{x+y} = \frac{\log_b c - \log_b a}{\log_b c + \log_b a}$ to take the treasure”

TASK:

- a) As the scout's leader help your team members to come up with the **four digit passcode key**
- b) Pave all the possible ways to see that your team takes the treasure.