A-Level Starter Activity

Jethwa Maths

Topic: Complex Surds

Chapter Reference: Pure 1, Chapter 1

8 minutes

1. Show that $\frac{4}{3}\sqrt{\frac{300}{4}} + \frac{10}{\sqrt{3}}$ can be written as k$\sqrt{a}$, where k and a are integers. **(4)**

2. Show that $(\frac{4}{3})^{\frac{1}{2}} + (\frac{1}{3})^{-\frac{1}{2}}$ can be written as $\frac{a}{b}\sqrt{c}$, where a, b and c are all integers. **(3)**

3. Show that $(4 + 3\sqrt{x})^2$ can be written as $16 + k\sqrt{x} + 9x$, where k is a constant to be found. **(2)**

Solutions

1.

$\frac{4}{3}\sqrt{\frac{300}{4}} = \frac{4}{3} \times \frac{\sqrt{300}}{\sqrt{4}} = \frac{4}{3} \times \frac{10\sqrt{3}}{2} = \frac{4}{3} \times 5\sqrt{3} = \frac{20\sqrt{3}}{3}$	**M1 M1**
$\frac{10}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{10\sqrt{3}}{3}$	**M1**
$\frac{20\sqrt{3}}{3} + \frac{10\sqrt{3}}{3} = \frac{30\sqrt{3}}{3} = 10\sqrt{3}$	**M1**

2.

$(\frac{4}{3})^{\frac{1}{2}} = \frac{\sqrt{4}}{\sqrt{3}} = \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$	**M1**
$(\frac{1}{3})^{-\frac{1}{2}} = 3^{\frac{1}{2}} = \sqrt{3}$	**M1**
$(\frac{4}{3})^{\frac{1}{2}} + (\frac{1}{3})^{-\frac{1}{2}} = \frac{2\sqrt{3}}{3} + \sqrt{3} = \frac{5}{3}\sqrt{3}$	**M1**

3.

$(4 + 3\sqrt{x})\ (4 + 3\sqrt{x}) = 16 + 9x + 12\sqrt{x} + 12\sqrt{x}$	**M1**
$16 + 24\sqrt{x} + 9x$	**M1**