

Expanding Brackets with Surds

(a) Show that $(5 - \sqrt{12})(2 + \sqrt{3})$ can be written in the form $a + \sqrt{b}$ where a and b are integers.

(b) Show that $(6 + \sqrt{2})(\sqrt{8} - 4)$ can be written in the form $a\sqrt{2} + b$ where a and b are integers.

(c) Show that $\sqrt{3}(\sqrt{12} - 2)^2$ can be written in the form $a\sqrt{3} + b$ where a and b are integers.

(d) Show that $(5 + \sqrt{5})(\sqrt{20} - 2)(3 - \sqrt{5})$ can be written in the form $a\sqrt{5} + b$ where a and b are integers.

(e) Show that $(1 + \sqrt{8})^3$ can be written in the form $p + \sqrt{q}$ where p and q are integers.

(f) Given that

$$(a + \sqrt{6})(10 - \sqrt{6}) = 24 + b\sqrt{6}$$

find the values of the integers a and b .

(g) Given that

$$(5 - \sqrt{8})(3 - a\sqrt{2}) = b - 21\sqrt{2}$$

find the values of the integers a and b .

(h) Given that

$$(p + 2\sqrt{q})^2 = 40 + 16\sqrt{q}$$

find the values of the integers p and q .

(i) Express $(6 + \sqrt{3})(a - 2\sqrt{3})(4 - \sqrt{12})$ in the form $b - 76\sqrt{3}$ where a and b are integers to be found.

(j) Given that

$$(p + \sqrt{q})(p - 3\sqrt{q}) = 13 - 14\sqrt{q}$$

find the values of the integers p and q .

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