Rationalising the Denominator Proof

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

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

(c) Show that $\dfrac{4\sqrt{2}-1}{3+\sqrt{8}}$ can be written in the form $a\sqrt{2} + b$, where a and b are integers to be found.

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

(e) Show that $\dfrac{(2+2\sqrt{7})^2}{3-\sqrt{7}}$ can be written in the form $a + b\sqrt{7}$, where a and b are integers to be found.

(f) Show that $\dfrac{\sqrt{8}(4-3\sqrt{2})}{\sqrt{2}+1} + 5(4 - \sqrt{2})$ can be written in the form $a + b\sqrt{2}$, where a and b are integers to be found.

(g) Given that $\dfrac{a+\sqrt{12}}{2-\sqrt{3}} = b + 10\sqrt{3}$ find the values of a and b.

(h) Given that
$$\dfrac{a}{(1+\sqrt{3})^2} + (a\sqrt{3})^3 = 2 + b\sqrt{3}$$
find the values of a and b.

(a) $13 + 7\sqrt{3}$ $\quad a = 13, b = 7$

(b) $9 - 5\sqrt{2}$ $\quad a = 9, b = -5$

(c) $14\sqrt{2} - 19$ $\quad a = 14, b = -19$

(d) $30 + 12\sqrt{5}$ $\quad a = 30, b = 12$

(e) $76 + 28\sqrt{7}$ $\quad a = 76, b = 28$

(f) $48 - 25\sqrt{2}$ $\quad a = 48, b = -25$

(g) $a = 6, b = 18$

(h) $a = 2, b = 23$