

## Answer on Question #69102 – Math – Algebra

### Question

1. If  $\frac{\sqrt{5}-1}{\sqrt{5}+1} + \frac{\sqrt{5}+1}{\sqrt{5}-1} = a + b\sqrt{5}$ , find a and b.

### Solution

$$\begin{aligned}\frac{\sqrt{5}-1}{\sqrt{5}+1} + \frac{\sqrt{5}+1}{\sqrt{5}-1} &= \frac{(\sqrt{5}-1)(\sqrt{5}-1)}{(\sqrt{5}+1)(\sqrt{5}-1)} + \frac{(\sqrt{5}+1)(\sqrt{5}+1)}{(\sqrt{5}-1)(\sqrt{5}+1)} \\ &= \frac{(\sqrt{5}-1)(\sqrt{5}-1) + (\sqrt{5}+1)(\sqrt{5}+1)}{(\sqrt{5}-1)(\sqrt{5}+1)} \\ &= \frac{5 - \sqrt{5} - \sqrt{5} + 1 + 5 + \sqrt{5} + \sqrt{5} + 1}{(\sqrt{5})^2 - 1^2} = \frac{12}{5-1} = \frac{12}{4} = 3\end{aligned}$$

**Answer:**  $a = 3, b = 0$ .

### Question

2. Simplify:  $1/(1 + \sqrt{2} - \sqrt{3})$  by rationalizing the denominator.

### Solution

$$\begin{aligned}\frac{1}{1 + \sqrt{2} - \sqrt{3}} &= \frac{1(1 - \sqrt{2} + \sqrt{3})}{(1 + \sqrt{2} - \sqrt{3})(1 - \sqrt{2} + \sqrt{3})} \\ &= \frac{1 - \sqrt{2} + \sqrt{3}}{1 - \sqrt{2} + \sqrt{3} + \sqrt{2} - 2 + \sqrt{6} - \sqrt{3} + \sqrt{6} - 3} = \frac{1 - \sqrt{2} + \sqrt{3}}{2\sqrt{6} - 4} \\ &= \frac{1 - \sqrt{2} + \sqrt{3}}{2(\sqrt{6} - 2)} = \frac{(1 - \sqrt{2} + \sqrt{3})(\sqrt{6} + 2)}{2(\sqrt{6} - 2)(\sqrt{6} + 2)} \\ &= \frac{\sqrt{6} + 2 - \sqrt{12} - 2\sqrt{2} + \sqrt{18} + 2\sqrt{3}}{2((\sqrt{6})^2 - 2^2)} \\ &= \frac{\sqrt{6} + 2 - 2\sqrt{3} - 2\sqrt{2} + 3\sqrt{2} + 2\sqrt{3}}{2(2)} = \frac{2 + \sqrt{6} + \sqrt{2}}{4}\end{aligned}$$

**Answer:**  $\frac{2 + \sqrt{6} + \sqrt{2}}{4}$ .

Answer provided by <https://www.AsignmentExpert.com>