Pi Mu Epsilon Problem of the Month
April 2019

A number b is <u>algebraic</u> if there is a polynomial $p(x)$ with integer coefficients such that $p(b) = 0$.

Two examples:
- $b = \sqrt{2}$ is algebraic because the polynomial $p(x) = x^2 - 2$ has $p(\sqrt{2}) = 0$.
- $b = \sqrt{3} + \sqrt{5}$ is algebraic because the polynomial $p(x) = x^4 - 16x^2 + 4$ has $p(\sqrt{3} + \sqrt{5}) = 0$.

Show that $b = \dfrac{1}{\sqrt{2}} + \sqrt{3}$ is algebraic by finding an appropriate polynomial $p(x)$.

Problem of the Month Rules:
⌘ Submissions must include a complete mathematical justification along with the answer.
⌘ Submissions may only be made by individuals or groups of two and must be dated.
⌘ Due date: April 26, 2019 before 5 p.m.; they may be given to Dr. Phillip Poplin or Dr. David Shoenthal.

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