Eleventh Problem of the Week, due Thursday 11/30

If

$$a = \sqrt{4 - \sqrt{5 - a}} \qquad , \qquad b = \sqrt{4 + \sqrt{5 - b}},$$
$$c = \sqrt{4 - \sqrt{5 + c}} \qquad , \qquad d = \sqrt{4 + \sqrt{5 + d}}.$$

Determine the value of the product $abcd$.

Hint: A polynomial of degree n always have n roots over the complex numbers, and the product of such roots equals the constant term of the polynomial.
For instance, the polynomial $p(x) = x^4 + 5x^3 - 20x + 18$ has 4 roots in the complex numbers, say the roots are r_1, r_2, r_3, r_4, then $r_1 r_2 r_3 r_4 = 18$.