

Problem of the Month, January 2008

Please turn all solutions into Dr. Dunn's office, JB 322. You may slide your solutions under his door as well. Most elegant solution wins a \$10 gift certificate to the bookstore! Solutions will be accepted anytime during the month of January, 2008. Good luck!

This problem has two parts:

1. The continued square root $\sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}$ is actually equal to an integer. What is its value?
2. Consider the equation $r = \sqrt{n + \sqrt{n + \sqrt{n + \dots}}}$. For which integers n is r an integer? On the other hand, which integers may be written as $\sqrt{n + \sqrt{n + \sqrt{n + \dots}}}$ for some integer n ?