

Solution to April Problem of the Month

Given that $a + (1/a) = 3$, what is the value of $|a - (1/a)|$?

$$|a - 1/a| = ?$$

$$a + \frac{1}{a} = 3 \quad a^2 + 1 = 3a$$

$$a^2 - 3a + 1 = 0$$

$$a = \frac{3 \pm \sqrt{9-4}}{2} = \frac{3 \pm \sqrt{5}}{2}$$

$$\rightarrow |a - 1/a| : \text{ substitute } \frac{1}{a} = 3 - a$$

$$= |2a - 3|$$

$$= \left| \frac{3 \pm \sqrt{5}}{2} \times 2 - 3 \right|$$

$$= |\cancel{3} \pm \sqrt{5} - \cancel{3}| = \sqrt{5}$$