## ROMANIAN MATHEMATICAL MAGAZINE

J. 2594 Solve for real numbers

$$
\begin{aligned}
\frac{1}{1+\tan ^{4} x}+\frac{1}{10}= & \frac{2}{1+3 \tan ^{2} x} \\
& \text { Proposed by Daniel Sitaru - Romania }
\end{aligned}
$$

## Solution by Titu Zvonaru-Romania

We denote $t=\tan ^{2} x$. We have the equation:

$$
\begin{gathered}
\frac{1}{1+t^{2}}+\frac{1}{10}=\frac{2}{1+3 t} \Leftrightarrow 10+30 t+1+t^{2}+3 t+3 t^{3}=20+20 t^{2} \Leftrightarrow \\
3 t^{3}-19 t^{2}+33 t-9=0 \Leftrightarrow(3 t-1)(t-3)^{2}=0 .
\end{gathered}
$$

It follows that $\tan x= \pm \frac{1}{\sqrt{3}}, \tan x= \pm \sqrt{3}$; the solutions are

$$
x= \pm 30^{\circ}+180^{\circ} k, x= \pm 60^{\circ}+180^{\circ} k
$$

where $k$ is an integer numbers.

