As this is a maximization problem, we need an upper bound of \( c^* \), and there is an easy one:

\[
c^* \leq m
\]

where \( m = |E| \).

The algorithm is: coloring every node independently with one of the three colors, each with probability \( \frac{1}{3} \).

Let random variable

\[
X_e = \begin{cases} 
1 & \text{edge } c \text{ is satisfied} \\
0 & \text{otherwise}
\end{cases}
\]

Then for any given edge \( e \), there are 9 ways to color its two ends, each of which appears with the same probability, and 3 of them are not satisfying.

\[
Exp[X_e] = Pr[e \text{ is satisfied}] = \frac{6}{9} = \frac{2}{3}
\]

Let \( Y \) be the random variable denoting the number of satisfied edges, then by linearity of expectations,

\[
Exp[Y] = Exp \left[ \sum_{e \in E} X_e \right] = \sum_{e \in E} Exp[X_e] = \frac{2}{3} m \geq \frac{2}{3} c^*
\]