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A Note on Star Critical Ramsey (C_n,K_6) Numbers for Large *n*

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Abstract. The study of Ramsey theory was initiated by the paper on a problem of formal logic written Ramsey. Let K_n denote the complete graph on n vertices. For any red/blue colouring of K_n, let H_R and H_B denote the red and blue subgraphs of K_n respectively so that $K_n = H_R \bigoplus H_B$. Let H, G be simple graphs. If there exists a red copy H in H_R or a blue copy G in H_B, we say that $K_n \longrightarrow (H, G)$. One branch of Ramsey theory, deals with the exact determination of Ramsey number, $r(H, G)$, defined as the smallest positive integer n such that $K_n \longrightarrow (H, G)$. For small size graphs H and G, Ramsey number $r(H, G)$ has been studied extensively in the last five decades. In the special case $H = G = K_n$ the exact determination of $r(K_n, K_n)$, swifts expeditiously from the apparent $r(K_3, K_3) = 6$, to the unmanageable $r(K_5, K_5)$. Currently, the best known lower and upper bounds for $r(K_5, K_5)$ are 43 and 48 ([7,8]). A closely related recent development in this area of study is the determination of Star critical Ramsey number $r^*(H, G)$ defined as the largest integer k such that $K_{r(G,H)-1} \sqcup K_{\{1,k\}} \longrightarrow (H, G)$. In this work, we find $r^*(C_n, K_6)$ when $n \geq 10$.

Keywords: Graph theory, Ramsey theory, Ramsey critical graphs

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