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Steven J Miller* (sjm1@williams.edu), Bronfman Science Center, Williams College,
Williamstown, MA 01267. *Painleve VI and Tracy-Widom Distributions in Random Graphs,*
Random Matrix Theory and Number Theory.

We report on two occurrences of Painleve VI and Tracy Widom distributions. The first is in number theory and random matrix theory, where the observed repulsion near the central point of low-lying zeros of elliptic curve L-functions can be explained by a discretized random matrix ensemble, where the first eigenangle above 1 is given by a Painleve VI equation. The second involves the distribution of the second largest eigenvalue of d-regular graphs, which we show numerically is well-modeled by the beta = 1 Tracy-Widom distribution. If the observed growth rates of the mean and standard deviation as a function of the number of vertices holds in the limit, then in the limit approximately 52% (resp. 26%) of bipartite (resp. non-bipartite) d-regular graphs should be Ramanujan. (Received February 10, 2011)