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George E Andrews* (gea1@psu.edu), Department of Mathematics, Pennsylvania State University, 306 McAllister Bldg., University Park, PA 16802. *Legendre Theorems for Subclasses of Overpartitions.*

This is a report on joint work with Ae Ja Yee. Legendre noted that Euler's pentagonal number theorem implies that the number of partitions of n into an even number of distinct parts almost always equals the number of partitions on n into an odd number of distinct parts (the exceptions occur when n is a pentagonal number). Building on ideas of Garvan and Jennings-Shaffer for smallest parts functions, we prove a number of Legendre type theorems for subclasses of overpartitions. For example, we call an overpartition top-heavy if the largest part appears both as an overlined parts and as a non-overlined part. We note that the number of top-heavy overpartitions of n equals the number of overpartitions of n that have no 1's. There is a surprising Legendre type theorem for top-heavy overpartitions: THEOREM. Let $THE(n)$ denote the number of top-heavy overpartitions of n with an even number of parts minus the number of top-heavy overpartitions of n with an odd number of parts. Then if $j^2 < n < (j+1)^2$, $THE(n) = (-1)^n(2j-1)$, and if $n = j^2$, then $THE(n) = (-1)^n(2j-2)$. Several other subclasses of overpartitions have similar theorems. (Received September 07, 2015)