1047-11-250 **Richard J. McIntosh*** (mcintosh@math.uregina.ca), Department of Mathematics and Statistics, University of Regina, Regina, Sask. S4S0A2, Canada. *Asymptotics and transformations of some Mordell integrals.*

In his last letter to Hardy, Ramanujan used asymptotic expansions to define mock theta functions. The asymptotic expansion of a mock theta involves the asymptotic expansion of certain Mordell intergrals. I will show how to obtain the asymptotic expansion and modular transformation of the Mordell integrals

$$J_c(r,\alpha)=\int_0^\infty e^{-\alpha x^2}\,\frac{\cosh r\alpha x}{\cosh \alpha x}\,dx \quad \text{and} \quad J_s(r,\alpha)=\int_0^\infty e^{-\alpha x^2}\,\frac{\sinh r\alpha x}{\sinh \alpha x}\,dx\,.$$

The transformation laws are:

$$\sqrt{\frac{\alpha^3}{\pi^3}}J_c(r,\alpha)=2\cos\Big(\frac{\pi r}{2}\Big)\int_0^\infty e^{-\beta x^2}\,\frac{\cosh \beta x}{\cos \pi r+\cosh 2\beta x}\,dx$$

and

$$\sqrt{\frac{\alpha^3}{\pi^3}}J_s(r,\alpha)=\sin(\pi r)\int_0^\infty \frac{e^{-\beta x^2}}{\cos \pi r+\cosh 2\beta x}\,dx$$

for $|r|<1$, where $\beta=\pi^2/\alpha$. (Received January 29, 2009)