$J = L(0)$ where

$$L(s) = \int_0^\infty \sum_{\substack{x \in \mathbb{Z} \\ x \equiv a\ (m|\Delta_0|)}} x\, e^{-\lambda x^2 \eta^2}\, \eta^{s+1} \frac{d\eta}{\eta}$$

$$= \int_0^\infty \sum_{\substack{x > 0 \\ x \equiv a}} - \sum_{\substack{x > 0 \\ x \equiv -a}}$$

$$= \left(\sum_{\substack{x > 0 \\ x \equiv a\ (m|\Delta_0|)}} \frac{1}{x^s} - \sum_{\substack{x > 0 \\ x \equiv -a}} \right) \Gamma\left(\frac{s+1}{2}\right) \lambda^{-\frac{s+1}{2}}$$

Thus

$$L(0) = \frac{\sqrt{m|\Delta_0|}}{2} \left(\sum_{\substack{x > 0 \\ x \equiv a\ (m|\Delta_0|)}} \frac{1}{x^s} - \sum_{\substack{x > 0 \\ x \equiv -a}} \frac{1}{x^s} \right) \Bigg|_{s=0}$$

But

$$\sum_{\substack{n = 1 \\ n \equiv a\ (N)}}^{\infty} \frac{1}{x^s} = \left(\frac{1}{2} - \frac{a}{N} \right) \qquad (0 < a \leq N).$$

Similarly, treat K like J after substitution

$\eta \to \frac{1}{\eta}$. $\square$