Д - 3

$f(x) = \ln(1 - x - 20x^2) = \ln((1+4x)(1+5x)) =$
$= \ln(1+4x) + \ln(1-5x)$, $x_0 = 0$

$\ln(1+x)$ $x_0 = 0$: $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n}{n}$

Для $f(x)$: $\sum_{n=1}^{\infty} (-1)^{n+1} \left(\frac{4x}{n}\right)^n + \sum_{n=1}^{\infty} (-1) \cdot$

$\cdot \frac{(4x^n) + (-5x)^n}{n} = \sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n(4^n + (-5)^n)}{n} =$

$= \sum_{n=1}^{\infty} (-1)^{n+1} \cdot \frac{(5x)^n \left(\left(\frac{4}{5}\right)^n + (-1)^n\right)}{n}$

Даламбер:

$$\lim_{n \to \infty} \left| \frac{\frac{(5x)^{n+1}\left(\left(\frac{4}{5}\right)^{n+1} + (-1)^{n+1}\right)}{n+1}}{\frac{(5x)^n\left(\left(\frac{4}{5}\right)^n + (-1)^n\right)}{n}} \right| =$$

$$= \lim_{n \to \infty} \left| 5x \frac{n}{n+1} \cdot \frac{\left(\left(\frac{4}{5}\right)^{n+1} + (-1)^{n+1}\right)}{\left(\left(\frac{4}{5}\right)^{n+1} + (-1)^n\right)} \right| =$$

$= |5x| < 1 \Rightarrow$ область сходимости $x \in \left(-\frac{1}{5}; \frac{1}{5}\right)$