1.3 Найти предел последовательности:

$$\lim_{n\to\infty} \frac{2n^3+13n(n+18)}{(27-n)(2n+19)^2} = (1)$$

$$2n^3+13n(n+18) = n^3\left(2+\frac{13n(n+18)}{n^3}\right) =$$

$$= n^3\left(2+\frac{13(n+18)}{n^2}\right) = n^3\left(2+13\left(\frac{n}{n^2}+\frac{18}{n^2}\right)\right) =$$

$$= n^3\left(2+13\left(\frac{1}{n}+\frac{18}{n^2}\right)\right)$$

$$(27-n)(2n+19)^2 = n\left(\frac{27}{n}-1\right)n^2\left(2+\frac{19}{n}\right)^2 =$$

$$= n^3\left(-1+\frac{27}{n}\right)\left(2+\frac{19}{n}\right)^2$$

$$\frac{2n^3+13n(n+18)}{(27-n)(2n+19)^2} = \frac{n^3\left(2+13\left(\frac{1}{n}+\frac{18}{n^2}\right)\right)}{n^3\left(-1+\frac{27}{n}\right)\left(2+\frac{19}{n}\right)^2} =$$

$$= \frac{2+13\left(\frac{1}{n}+\frac{18}{n^2}\right)}{\left(-1+\frac{27}{n}\right)\left(2+\frac{19}{n}\right)^2}$$

$$(1) = \lim_{n\to\infty} \frac{2+13\left(\frac{1}{n}+\frac{18}{n^2}\right)}{\left(-1+\frac{27}{n}\right)\left(2+\frac{19}{n}\right)^2} =$$

$$= \frac{2+13\left(\lim\limits_{n\to\infty}\frac{1}{n}+18\lim\limits_{n\to\infty}\frac{1}{n^2}\right)}{\left(-1+27\lim\limits_{n\to\infty}\frac{1}{n}\right)\left(2+19\lim\limits_{n\to\infty}\frac{1}{n}\right)^2} =$$

$$= \frac{2+13(0+18\cdot 0)}{(-1+27\cdot 0)(2+19\cdot 0)^2} = \frac{2+0}{(-1+0)(2+0)^2} = \frac{2}{(-1)2^2} = -\frac{1}{2}$$

Ответ: $\boxed{\lim\limits_{n\to\infty} \frac{2n^3+13n(n+18)}{(27-n)(2n+19)^2} = -\frac{1}{2}}$