№15

$$\lim_{x\to\frac{\pi}{4}} \frac{\ln tg\,x}{\frac{\pi}{4}-x} = \left[\frac{0}{0}\right] = \lim_{x\to\frac{\pi}{4}} \frac{\frac{\cos x}{\sin x}\cdot\frac{1}{\cos^2 x}}{1} = \lim_{x\to\frac{\pi}{4}} \frac{1}{\sin x\cos x} =$$

$$= \frac{1}{\frac{\sqrt{2}}{2}\cdot\frac{\sqrt{2}}{2}} = 2.$$

№16.

$$\lim_{x\to 0}\left(\frac{2}{\pi}\arccos x\right)^{\frac{1}{\arcsin x}} = A$$

$$\ln A = \lim_{x\to 0}\frac{\ln\left(\frac{2}{\pi}\arccos x\right)}{\arcsin x} = \left[\frac{0}{0}\right] =$$

$$= \lim_{x\to 0}\frac{\frac{1}{\frac{2}{\pi}\arccos x}\cdot -\frac{1}{\cancel{\sqrt{1-x^2}}}\cdot\frac{2}{\pi}}{\cancel{\frac{1}{\sqrt{1-x^2}}}} = \lim_{x\to 0}\frac{1}{-\arccos x} =$$

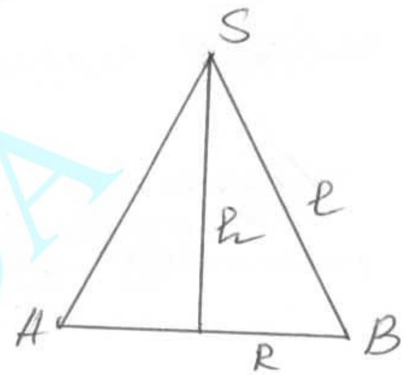
$= -\frac{2}{\pi}$. Т.к. $A = e^{\ln A}$, то $\underline{A = e^{-\frac{2}{\pi}}}$.

№17

l

$V \to max?$

Осевое сечение конуса имеет вид:



$V = \frac{1}{3}\pi R^2 h$.

Выразим R через h и l:

$R^2 = l^2 - h^2$. Тогда

$V(h) = \frac{1}{3}\pi(l^2 h - h^3)$

$V' = \frac{1}{3}\pi(l^2 - 3h^2)$; $V' = 0$: $h = \frac{l}{\sqrt{3}}$. Т.к. $h \in (0; l)$, то получаем:

h	$(0; l/\sqrt{3})$	$l/\sqrt{3}$	$(l/\sqrt{3}; l)$
V'	+	0	−
V	↗	max	↘

$\Rightarrow$ при $h = \frac{l}{\sqrt{3}}$ объем конуса будет максимальным.

№18

$y = \cos^2(2x+6)$, $x_0 = -4$; $n = 5$

$$y \sim y(-4) + \frac{y'(-4)}{1!}(x+4) + \frac{y''(-4)}{2!}(x+4)^2 + \frac{y'''(-4)}{3!}(x+4)^3 +$$

$$+ \frac{y^{IV}(-4)}{4!}(x+4)^4 + \frac{y^{V}(-4)}{5!}(x+4)^5 + o\left((x+4)^5\right)$$

$y(-4) = \cos^2(-2) = \cos^2 2$