

1. ,
,
(6)

$$: a^2 - b^2 = ac \times \cos B - bc \times \cos A.$$

$$: bc = 2S / \sin A, ac = 2S / \sin B.$$

():

$$b^2 - a^2 = 2S \times (\operatorname{ctg} A - \operatorname{ctg} B),$$

$$c^2 - b^2 = 2S \times (\operatorname{ctg} B - \operatorname{ctg} C).$$

$$b^2 - a^2 = c^2 - b^2.$$

2. , $p = 100a + 10b + c$ 37,
 $q = 100b + 10c + a$ $r = 100c + 10a + b$ 37 (a, b, c —).
(6)

$$. p = 100a + 10b + c = 37k.$$

$$q = 100b + 10c + a = 10p - 999a = 370k - 37 \times 27a.$$

$$, q = 37.$$

$$, r = 100c + 10a + b = 37.$$

3. n ,

$$1 < x < 2, 2 < x^2 < 3, \dots, n < x^n < n + 1$$

(6)

$$: n = 4.$$

:

$$\begin{cases} 1 < x < 2, \\ \sqrt{2} < x < \sqrt{3}, \\ \sqrt[3]{3} < x < \sqrt[3]{4}, \\ \sqrt[4]{4} < x < \sqrt[4]{5}, \\ \sqrt[5]{5} < x < \sqrt[5]{6}, \\ \vdots \end{cases}$$

x,

$$3^5 > 6^3, \quad n = 5 \quad : \quad [\sqrt[3]{3}, \sqrt[4]{4}]$$

$$[\sqrt[5]{5}, \sqrt[6]{6}]$$

($n = 4$, $x = 1,45$).

4. $m \geq n \geq 1$,

$$\sqrt[n]{m} \geq \sqrt[n]{n} \geq \sqrt[3]{3}.$$

(6)

, $m \geq n \geq 2$.

$$\sqrt[m]{n} \leq \sqrt[n]{n}.$$

$$\sqrt[n]{n} \leq \sqrt[3]{3} \quad (0.1)$$

, $n^{1/n} \leq 3^{1/3}$, $n = 2$ $2^{1/2} \leq 3^{1/3}$, $8 < 9$,

(0.1), $\frac{\ln n}{n} \leq \frac{\ln 3}{3}$ $n \geq 3$, $f(x) = \frac{\ln x}{x}$, $x > 0$.

$$f'(x) = \frac{1 - \ln x}{x^2}$$

$x \geq 3 > e$, $\ln x > \ln 3 > 1$, $f'(x) < 0$.

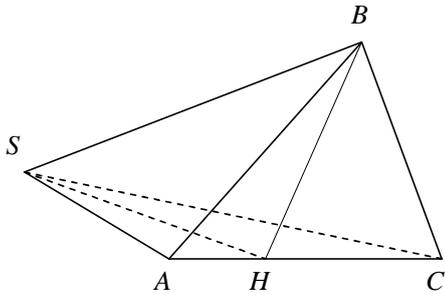
, $x \geq 3$ $f(x)$, $n \geq 3$

$f(n) \leq f(3)$,

5. (6)

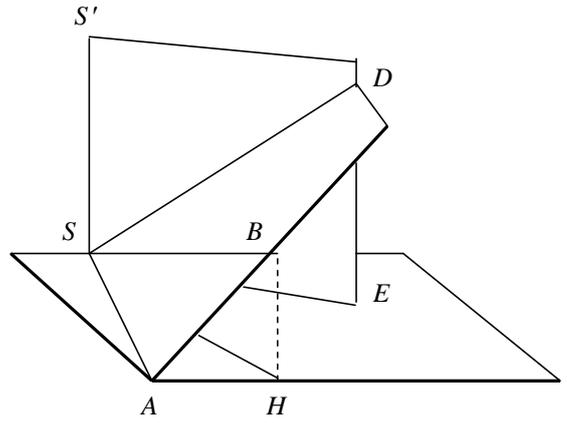
$SABCD - 180^\circ$, S .

SB SAC $B(SA)C$ $B(SC)A - SA$ SC, \dots SH



. 1

$\angle ASH < 90^\circ$, $\angle CSH < 90^\circ$.
 SAC (. . 1).
 $SABH$
 SBA
 $S'SE$, $AS \perp SD$, $\angle ASB$
 $\angle ASB -$
 $\angle BSC < 90^\circ$.



. 2

$\angle ASC < \angle 180^\circ$,
 $S'SE$, $\angle ASH < 90^\circ$.
 AS (. . 2).
 $A(S'S)E$.
 $S'SE$ SD . $AS \perp$
 $\angle ASD$. $\angle ASB -$
 $\angle ASC < 180^\circ$ $\angle ASH < 90^\circ$,
 $\angle ASB < 180^\circ$, $\angle ASC < 90^\circ$