COMPARAREA A DOI LOGARITMI

Comparați:

1) $\log_{\frac{2}{3}} \frac{4}{5}$ cu $\log_{\frac{3}{5}} \frac{2}{5}$

2) $\log_{\frac{2}{3}} \frac{4}{5}$ cu $\log_{\frac{3}{4}} \frac{5}{4}$

3) $\log_{\frac{1}{5}} 2$ cu $\log_{\frac{3}{5}} 3$

4) $\log_2 7$ cu $\log_3 50$

5) $\log_2 \frac{1}{8}$ cu $\log_{\frac{1}{2}} 16$

6) $\log_{\frac{1}{5}} 2$ cu $\log_{\frac{1}{5}} 7$

7) $\log_{\frac{5}{2}} 3$ cu $\log_{\frac{5}{2}} 7$

8) $\log_7 2$ cu $\log_3 5$

9) $\log_7 2$ cu $\log_5 3$

10) $\log_3 5$ cu $\log_7 2$

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Comparați: $\log_{\frac{2}{3}} \frac{4}{5}$ cu $\log_{\frac{3}{5}} \frac{2}{5}$

E_1) $\frac{4}{5}$ îl încadrez în funcție de puteri ale lui $\frac{2}{3}$; $\frac{4}{5} = 0,8$

$\frac{2}{3} = 0,66\ldots$

$\Rightarrow \left(\frac{2}{3}\right)^1 < \frac{4}{5} < \left(\frac{2}{3}\right)^0 \mid \log_{\frac{2}{3}}(\ldots)$

$\underset{b \in (0;1)}{\Longrightarrow} \log_{\frac{2}{3}} \left(\frac{2}{3}\right)^1 > \log_{\frac{2}{3}} \frac{4}{5} > \log_{\frac{2}{3}} \left(\frac{2}{3}\right)^0$

$\Rightarrow 1 > \log_{\frac{2}{3}} \frac{4}{5} > 0$

$\Rightarrow 0 < \log_{\frac{2}{3}} \frac{4}{5} < 1 \Rightarrow \boxed{\log_{\frac{2}{3}} \frac{4}{5} = 0,\ldots}$

E_2) $\frac{2}{5} = 0,4$ îl încadrez în șirul de puteri ale lui $\frac{3}{5} = 0,6 \Rightarrow \left(\frac{3}{5}\right)^2 < \frac{2}{5} < \frac{3}{5} \mid \log_{\frac{3}{5}}(\ldots)$

$\underset{b \in (0;1)}{\Longrightarrow} \log_{\frac{3}{5}} \left(\frac{3}{5}\right)^2 > \log_{\frac{3}{5}} \frac{2}{5} > \log_{\frac{3}{5}} \frac{3}{5}$

$\Rightarrow 2 > \log_{\frac{3}{5}} \frac{2}{5} > 1 \Rightarrow \boxed{\log_{\frac{3}{5}} \frac{2}{5} = 1,\ldots}$

E_3) $\log_{\frac{2}{3}} \frac{4}{5} < \log_{\frac{3}{5}} \frac{2}{5}$

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24 I4

Comparați:

$a = \log_2 \frac{1}{8}$ cu $b = \log_{\frac{1}{2}} 16$

$E_1)\ a = \log_2 2^{-3} = -3 \log_2 2 = -3$

$E_2)\ b = \log_{\frac{1}{2}} 16 = \log_{2^{-1}} 16 = \frac{1}{-1} \log_2 2^4 = -4$

$E_3)\ -4 < -3 \Rightarrow b < a$

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Comparați:

$$\log_{\frac{2}{3}} \frac{4}{5} \quad \text{cu} \quad \log_{\frac{3}{5}} \frac{5}{4}$$

E_1) pt. $\log_{\frac{2}{3}} \frac{4}{5}$

$$\left.\begin{array}{l} b = \frac{2}{3} \in (0;1) \\ A = \frac{4}{5} \in (0;1) \end{array}\right\} \Rightarrow \log_{\frac{2}{3}} \frac{4}{5} > 0$$

E_2) pt $\log_{\frac{3}{5}} \frac{5}{4}$

$$\left.\begin{array}{l} b = \frac{3}{5} \in (0;1) \\ A = \frac{5}{4} \in (1;\infty) \end{array}\right\} \Rightarrow \log_{\frac{3}{5}} \frac{5}{4} < 0$$

E_3) $\log_{\frac{3}{5}} \frac{5}{4} < \log_{\frac{2}{3}} \frac{4}{5}$

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Comparați:

a) $\log_{\frac{1}{5}} 2$ cu $\log_{\frac{1}{5}} 7$

b) $\log_{\frac{5}{2}} 3$ cu $\log_{\frac{5}{2}} 7$

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a) $\left.\begin{array}{l} b = \frac{1}{5} \in (0;1) \\ 2 < 7 \end{array}\right\} \Rightarrow \log_{\frac{1}{5}} 2 > \log_{\frac{1}{5}} 7$

b) $\left.\begin{array}{l} b = \frac{5}{2} \in (1;\infty) \\ 3 < 7 \end{array}\right\} \Rightarrow \log_{\frac{5}{2}} 3 < \log_{\frac{5}{2}} 7$

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Comparați: $\log_2 7$ cu $\log_3 50$

E_1) încadrăm argumentul logaritmului în funcție de puteri.

E_2) pt $\log_2 7$: $2^2 < 7 < 2^3 \mid \log_2(-)$

$$\log_2 2^2 < \log_2 7 < \log_2 2^3$$

$$2\log_2 2 < \log_2 7 < 3\log_2 2$$

$$2 < \log_2 7 < 3$$

$$\Rightarrow \log_2 7 = 2,\ldots \quad (1)$$

E_3) pt $\log_3 50$: $3^3 < 50 < 3^4 \mid \log_3(-)$

$$\Rightarrow \log_3 3^3 < \log_3 50 < \log_3 3^4$$

$$3 < \log_3 50 < 4$$

$$\Rightarrow \log_3 50 = 3,\ldots \quad (2)$$

E_4) Din (1) + (2) $\Rightarrow \log_2 7 < \log_3 50$

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