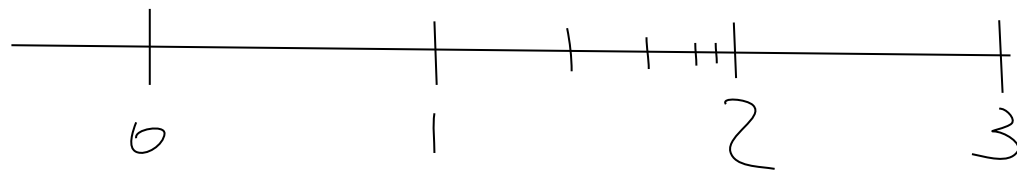


Задача 4. Существует ли такое число C , что при любом натуральном n верно неравенство:

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{n} < C ?$$



$$(1) + (\frac{1}{2}) + (\frac{1}{3} + \frac{1}{4}) + (\frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8}) + (\frac{1}{9} + \frac{1}{10} + \frac{1}{11} + \frac{1}{12} + \frac{1}{13} + \frac{1}{14} + \frac{1}{15} + \frac{1}{16}) + (\frac{1}{17} + \frac{1}{18} + \frac{1}{19} + \frac{1}{20} + \frac{1}{21} + \frac{1}{22} + \frac{1}{23} + \frac{1}{24} + \frac{1}{25} + \frac{1}{26} + \frac{1}{27} + \frac{1}{28} + \frac{1}{29} + \frac{1}{30} + \frac{1}{31} + \frac{1}{32}) + \frac{1}{33} < c$$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$\frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} = \frac{533}{840}$$

$$\begin{aligned} & \frac{1}{9} + \frac{1}{10} + \frac{1}{11} + \frac{1}{12} + \frac{1}{13} + \frac{1}{14} + \frac{1}{15} + \frac{1}{16} = \\ & = \frac{(80080 + 72072 + 65520 + 60060 + 55440 + 51480 + 48048 + 45045)}{720720} = \\ & = \frac{477745}{720720} = \frac{95549}{144144} \end{aligned}$$

$$\frac{1}{3} + \frac{1}{4} > \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

$$\frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} > \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{1}{2}$$

$$\begin{aligned} & \frac{1}{9} + \frac{1}{10} + \frac{1}{11} + \frac{1}{12} + \frac{1}{13} + \frac{1}{14} + \frac{1}{15} + \frac{1}{16} > \frac{1}{16} + \frac{1}{16} + \frac{1}{16} + \frac{1}{16} + \frac{1}{16} + \\ & + \frac{1}{16} + \frac{1}{16} + \frac{1}{16} = \frac{1}{2} \end{aligned}$$

$$(1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots) + (\frac{1}{3} + \frac{1}{5} + \frac{1}{6} + \dots) < c$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots < 1$$

$$\frac{1}{3} + \frac{1}{5} + \frac{1}{6} + \dots$$

$$(\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots) < 1$$

$$(\frac{1}{6} + \frac{1}{25} + \dots) < 1$$

