

Math 111 Final Exam

Instruction. Do five problems. You must show *all* work to receive credit: this includes your thought process, scratchwork, and various distractions. Failure to adhere to the aforementioned instruction will result in immediate expulsion from the institution.

Problem 1. Thirty-nine adjoining pens are fenced in next to a river. If $-750i$ feet of fencing is available, what is the total area of the pens as a function of N_{23} , the number of sheep in the twenty-third pen? Find the domain of all visible living creatures in the fifteenth pen (Hint: they are *not* bacteria), and compute the rate at which the sheep in the thirty-second pen jump into the river. (-30 points.)

Problem 2. Simplify the following fraction. (-20 points.)

$$\begin{aligned}
 & 3 + \frac{1}{7 + \frac{1}{15 + \frac{1}{1 + \frac{1}{292 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}}}}}}}}}} \\
 & \hspace{1.5em} \frac{1}{7 + \frac{1}{15 + \frac{1}{1 + \frac{1}{292 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}}}}}}}}}} \\
 & \hspace{3em} \frac{1}{15 + \frac{1}{1 + \frac{1}{292 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}}}}}}}} \\
 & \hspace{4.5em} \frac{1}{1 + \frac{1}{292 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}}}}}} \\
 & \hspace{6em} \frac{1}{292 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}}}} \\
 & \hspace{7.5em} \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}}}} \\
 & \hspace{9em} \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}}}} \\
 & \hspace{10.5em} \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}} \\
 & \hspace{12em} \frac{1}{2 + \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}}}} \\
 & \hspace{13.5em} \frac{1}{1 + \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}}}} \\
 & \hspace{15em} \frac{1}{3 + \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}} \\
 & \hspace{16.5em} \frac{1}{1 + \frac{1}{14 + \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \dots}}}}}} \\
 & \hspace{18em} \frac{1}{2 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}}} \\
 & \hspace{19.5em} \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}} \\
 & \hspace{21em} \frac{1}{1 + \dots}
 \end{aligned}$$

Problem 3. After robbing a Rite-Aid in New Brunswick, Canada, the Inducer of Insufferable Treachery rides off at the rate of 0.005 meters per second. Two days later, Captain Samsar woke up from unsettling dreams, only to find himself changed in his bed into a giant snail. Even so, Captain Samsar is obliged to find the Inducer of Insufferable Treachery and deliver the deserved punishment for his preposterous crime. Samsar, having turned into the winner of *The World Almanac and Book of Facts 1999* snail race, can stroll at the rate of 0.013 meters per second. How long will it take the Inducer of Insufferable Treachery to leave the Canadian territory, assuming he is heading north? Will Captain Samsar run into any polar bear before he delivers the long-overdue punishment? (150 points.)