

Year 5. Problem Set 107 (2009-2010 school year).

1. Every evening, a herd of elephants comes to a waterhole. A herd of 183 elephants can drink up all the water in the waterhole in one day. A herd of 37 elephants can do it in 5 days. (A water supply in the waterhole is partially replenished by a spring at the bottom of the hole). How many days would it take for a single elephant to dry up the waterhole?



2. Prove that $\sqrt[3]{7}$ is irrational.
3. Prove that the set of rational numbers on the real line is dense. It means that for every very short segment on the real line it is possible to find a rational number that is located within this segment.
4. A decimal expansion of a number is:
a) 0.101001000100001000001...
b) 0.123456789101112131415...
Is this number rational?
5. Write the following numbers as fractions m/n , where m and n are integers:
- 0.(7)
 - 0.0(7)
 - 0.00(77)
 - 0.(123)
 - 0.000(12)
 - 0.34(52)
6. ABC is a triangle. Its sides $AB = 5$, $BC = 7$, $CA = 10$. A circle is inscribed into this triangle. A line tangent to this circle intersects sides AB and BC of the triangle in the points M and K correspondingly. Find perimeter of triangle MKB .