

UPDATED GENERAL INFORMATION — MAY 11, 2019

Study problems for the second quiz

1. Express $5/13$ as a (finite) continued fraction.
2. Find infinitely many distinct solutions for the equation

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{xy}$$

where x and y are positive rational numbers.

3. Find infinitely many distinct solutions for the equation

$$x + y = \frac{x}{y}$$

where x and y are positive rational numbers.

4. Suppose that we are given two positive integers A and B . Under what conditions does the system of Diophantine equations $x + y = A$, $x^2 + y^2 = B$ have a solution such that x and y are both positive rational numbers?
5. Use the Pappus centroid theorem for surface areas to find the lateral surface area for the cone of revolution formed by rotating the line segment $y = mx$, where $m > 0$ and $0 \leq x \leq b$, about the x -axis.
6. Describe the set of all integral solutions for the system of congruences

$$x \equiv 1 \pmod{2}, \quad x \equiv 2 \pmod{3}, \quad x \equiv 3 \pmod{5}, \quad x \equiv 5 \pmod{7} .$$

Express the answer in the form $x = mk + b$ where k is an arbitrary integer and the constants m and b have specific values.