

Name: _____

Please show all work. Check your answers! 😊

1. Find all integer solutions to the equation $48x - 34y = 6$
2. Solve the following system of two congruence equations

$$4x \equiv 10 \pmod{13}$$

$$6x \equiv 9 \pmod{11}$$

3. Suppose a sequence x_n is defined recursively by $x_0 = 2, x_1 = 4$ and for $n > 1$
 $x_n = 4x_{n-1} - 3x_{n-2}$. Prove by induction that $x_n = 3^n + 1$ for all $n \geq 0$
4. Prove that $8^{\frac{1}{7}} = \sqrt[7]{8}$ is irrational.

1	2	3	4	total (40)