Boston University   Number Theory
Summer I 2009   Kalin Kostadinov

Quiz II

student:
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Question 1: Using the $\frac{p}{q}$−criterion, list all the rational numbers that can be roots of the equation
$6x^8 - 7x^5 + 13x^2 - 5x - 4 = 0.$

Question 2: A diophantine equation has the sum of all its coefficients equal 0. Does it have a solution? Yes?No? Cannot be determined? Justify your answer.

Question 3: Find the GCD of 455 and 1547.

Question 4: Dio cashes a check worth less than 100$ for x dollars and y cents, but the teller inadvertently pays him y dollars and x cents. After Dio buys a newspaper for k cents, the remaining money is twice as much as the original value of the check. If k = 50, find the amount of the check.
(Problem taken from 'Numb3rs' activity.)

Question 5: Solve the congruences:

$$20x \equiv 13 \pmod{27} \qquad\qquad x^2 + 5x \equiv 3 \pmod{7}$$