

UW Math Circle

April 28, 2016

Homework



1. You want to send a letter, but all you have are 4 and 5 cent stamps. Can you use these stamps to put the right amount of postage on your letter if the postage is 10 cents? 11 cents? 12 cents? What is the largest amount of postage that you cannot make with 4 and 5 cent stamps?
2. Now you have 3 and 5 cent stamps. What is the largest amount of postage you cannot make? What about with 7 and 11 cent stamps?
3. Formulate a conjecture for the maximum amount of postage you can't make with a and b cent stamps, where a and b are positive and their greatest common divisor is 1. Try to prove it!
4. How does this problem change when your stamps have a common divisor?
 - (a) With 12 and 18 cent stamps, show that you can only make the postage if it is a multiple of 6. What is the largest multiple of 6 you can't make with 12 and 18 cent stamps?
 - (b) What is the largest multiple of 5 you can't make with 20 and 25 cent stamps?