Prime Numbers 5

(use calculator as directed by your teacher)

As you may have found out from the previous sheet, it is not necessary to test all possible factors of a number to see if it is prime. You only need to test for prime factors.
This greatly improves our first method. Can we improve our method still further?

1. Consider the number 36. All its multiplication facts are,
   1 x 36
   2 x 18
   3 x 12
   4 x 9
   6 x 6
   Apart from the special case of 1x36, what is the highest factor left in the list?

2. Here are all the multiplication facts for 60,
   1 x 60
   2 x 30
   3 x 20
   4 x 15
   5 x 12
   6 x 10
   Apart from the special case of 1x60, what is the highest factor left in the list?

3. For each of the following, write down the highest factor you can find (apart from the number itself).

a) 12	b) 50	c) 48	d) 66	e) 35	f) 63
g) 75	h) 100	i) 51	j) 44	k) 40	l) 96

4. Copy and complete this conclusion: "The highest factor of any number will always be equal to or less than..... "

example: Is 133 a prime or not?

try 2, $133 \div 2 = 66r1$	2 is not a factor	try next prime
try 3, $133 \div 3 = 44r1$	3 is not a factor	try next prime
try 5, $133 \div 5 = 26r3$	5 is not a factor	try next prime
try 7, $133 \div 7 = 19$	7 is a factor	therefore **133 is not prime**

example: Is 137 a prime or not?

try 2, 137 ÷ 2 = 68r1	try 3, 137 ÷ 3 = 45r2	try 5, 137 ÷ 5 = 27r2
try 7, 137 ÷ 7 = 19r4	try 11, 137 ÷ 11 = 12r5	try 13, 137 ÷ 13 = 10r7
try 17, 137 ÷ 17 = 8r1	try 19, 137 ÷ 19 = 7r4	try 23, 137 ÷ 23 = 5r22
try 29, 137 ÷ 29 = 4r21	try 31, 137 ÷ 31 = 4r13	try 37, 137 ÷ 37 = 3r26
try 41, 137 ÷ 41 = 3r14	try 43, 137 ÷ 43 = 3r8	try 47, 137 ÷ 47 = 2r43
try 53, 137 ÷ 53 = 2r31	try 59, 137 ÷ 59 = 2r19	try 61, 137 ÷ 61 = 2r15
try 67, 137 ÷ 67 = 2r3	the next prime to try is 71 and is too big (over half of 137)	
	So 137 is prime	

5. Using only prime factors up to half the value of the number, test each of the following to see if they are prime numbers (use the above examples for help);-

a) 129	b) 161	c) 121	d) 183	e) 103	f) 141
g) 247	h) 209	i) 371	j) 113	k) 403	l) 167