Factors and Primes Numbers Questions

1) Consider the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.

a) List the factors of each of these numbers.

Numbers	Factors
1	1
2	1, 2
3	1, 3
4	1, 2, 4
5	1, 5

Number	Factors
6	1, 2, 3, 6
7	1, 7
8	1, 2, 4, 8
9	1, 3, 9
10	1, 2, 5, 10

b) Which of these are prime?

A prime number has exactly 2 factors; 1 and itself.
So 2, 3, 5 and 7 are prime.

2) Consider the numbers 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20.

a) List the factors of each of these numbers.

Numbers	Factors
11	1, 11
12	1, 2, 3, 4, 6, 12
13	1, 13
14	1, 2, 7, 14
15	1, 3, 5, 15

Number	Factors
16	1, 2, 4, 8, 16
17	1, 17
18	1, 2, 3, 6, 9, 12
19	1, 19
20	1, 2, 4, 5, 10, 20

b) Which of these are prime?

11, 13, 17 and 19 are prime.

3) Explain why 63 is not a prime number.

Because it has 6 factors (1, 3, 7, 9, 21, 63) and a prime number has only 2.

4) Which of the following are prime numbers: 33, 35, 37, 39?

Factors of 33 are 1, 3, 11 and 33 so not prime.

Factors of 35 are 1, 5, 7 and 35 so not prime.

Factors of 37 are 1 and 37 so prime.

Factors of 39 are 1, 3, 13 and 39 so not prime.

5) Which of the factors of 72 are prime numbers (known as prime factors)?

Factors of 72 are 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36 and 72.
Of these 2 and 3 are prime numbers.

6) Consider the numbers 40 and 70.

a) What are the prime factors of 40?

Factors of 40 are 1, 2, 4, 5, 8, 10, 20 and 40.
Of these 2 and 5 are prime.

b) What are the prime factors of 70?

Factors of 70 are 1, 2, 5, 7, 10, 14, 35 and 70.
Of these 2 and 5 are prime.

c) What prime factors do 40 and 70 have in common?

2 and 5.

7) Find the prime factors that 48 and 54 have in common.

Factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24, 48.
Of these 2 and 3 are prime.

Factors of 54 are 1, 2, 3, 6, 9, 18, 27 and 54.
Of these 2 and 3 are prime.

So they have 2 and 3 in common.

8) The first 5 prime numbers are 2, 3, 5, 7 and 11. What is the smallest number that has all these prime factors?

As these are all prime factors the smallest number that has all these prime factors is the product of these factors:

i.e. $2 \times 3 \times 5 \times 7 \times 11 = 2310$

9) Write down the first two prime numbers which are greater than 100.

Start with 101, we can find no other factors but 1 or 101 and so it is prime.
102, it is even so has at least the additional factor of 2 and so is not prime.
103, we can find only the factors 1 and 103 and so is prime.
So 101 and 103.

10) Which is the first prime number greater than 200?

We need only find one other factor (than 1 or itself) to prove a number is not prime.
201, additional factor of 3 so not prime.
202, and all other even numbers have factor 2 and so not prime.
203, additional factor of 7.
205, additional factor of 5.
207, additional factor of 3.
209, additional factor of 11.
211, has no additional factor and so is prime.