Stepping stones for questions on set theory

The second attached doc has all the questions on set theory from the exam papers compiled. All the 2.questions are of 2 marks. 3. questions are of 3 marks etc. In my opinion the 3. And 4. questions are too difficult for the first run.

So I am only giving stepping stones for the 2. Questions.

1. Take a set of 3 cubes : red yellow and green.
   How many different subsets can be made with one cube in the subset ?
   How many different subsets can be made with 2 cubes ?
   How many subsets with 3 cubes ?
   How many subsets with no cubes ?
   Ans : 3,3,1 and 1.

   Add 3 + 3+ 1+1 = 8 Note that 8 = 2^3
   This is the total number of subsets of a set with 3 elements.

2. Repeat the above exercise with 4 cubes of different colour.

   How many different subsets can be made with 1 cube in the subset ? (4)
   How many different subsets can be made with 2 cubes ? (6)
   How many subsets with 3 cubes ? (6)
   How many subsets with 4 cubes ? (1)
   How many subsets with no cubes (1)

   Add 1 + 4 + 6 + 4 + 1 = 16 = 2^4

   This is the total number of subsets of a set with 4 elements.

3. Repeat the exercise with 5 cubes. What is the total number of subsets of a set with 5 elements ?
4. What is the total number of subsets of a set with 6 element ?
5. Repeat the example 1 with the set of numbers {1,2,3}. Write all the subsets.
6. Repeat the example 5 with the set of numbers {1,3,4}
7. Repeat the example 5 with the set of letters {a,b,c}
8. Repeat the example 5 with the set of ordered pairs (1,1), (1,2) and (1,3) Write all the subsets.
9. Repeat example 2 with the set of numbers {1,3,5,6}
10. Repeat example 2 with the set of letters { x,y,z,t}

Stepping stones for Ordered pairs

1. Take slates and divide each slate into two parts with a vertical line. Each such slate will represent an ordered pair.
   Take the first set as A = { red, green} . Take the second set as B= { blue , white , yellow}. Make the six ordered sets corresponding to A x B.

   [Ans : (r,b), (r,w),(r,y), (g,b), (g,w), (g,y)]

2. repeat the above example with the numbers 1,2 written on the A slate, as members of the A set and the numbers 3,4,5 written on the B slate.
   Make ordered pairs by writing the appropriatenumbers on each of the ordered pair slates.

3. Repeat example 2. by writing the set A as {,1,2} and the set B as { 3,4,5} and now writing the ordered pairs of A x B.
4. If A = {x,y} and B ={ 3,4,5}, write the ordered pairs of A x B
5. Write the ordered pairs of B x A
6. Is A x B = B x A ?

Equality of ordered pairs

Two ordered pairs are equal only if their first elements are equal and also the second elements are equal.

Example (x,y)= (2,3) means that x=2 and y=3

7. If (x,y) = (3,2), then what is x= ? y= ?
8. If (x+2, y+4) = (4, 5) then find the values of x and y.

Stepping stones for intersection and union

1.   Take two slates. On one slate keep r,g,y cubes. (set A)
        On the other slate keep (r,g,b,w) cubes.   (set B)

        Make the intersection set. A ^ B
        Make the union set.   A v B

   2. Repeat the above example by writing on paper with A = {1,2,3} and   B= { 1,2,4,5}
       Write the sets A ^ B and A v B

   3. If C = { a,b,c} write the elements of AxC and Bx C
   4. Write the elements of (A^B) x C
   5. Write the elements of (AvB) x C

Stepping stone for Relations

A relation between set A and set B is any subset of A x B

   6. If A = {1} and B = { 1,2,3},

       a. write A x B.

       b. If A x B has 3 elements(such as in the example above) , then how many different
       relations exist between A and B ?
       Write each relation.

       Ans :
       a. A x B = { (1,1), (1,2), (1,3)}

       b. The 8 relations are as under
       { },
       { (1,1)},   {(1,2)}, {(1,3)},
       {(1,1), (1,2) },   {(1,1), (1,3)},   { (1,2), (1,3)}
       {(1,1),(1,2),(1,3)}