1. In a group of 15 Lego experts, 10 build with red bricks, 7 like building with black bricks (and sometimes really really dark gray), and six like both.

(a) How many people like building with at least one of these types of bricks?

(b) How many like red bricks but not black bricks (and sometimes really really dark gray)?

(c) How many like exactly one of the two colors?

(d) how many like neither?

2. In a recent survey of Indiana grads, it was found that 200 had undergraduate degrees in arts, 95 had undergraduate degrees in science, and 120 had graduate degrees. 55 of those with undergraduate degrees also had a graduate degree, 40 of those with science degrees had a graduate degree, 25 people had undergraduate degrees in both arts and science, and 5 people had undergraduate degrees in arts and science and also a graduate degree.

(a) How many people had at least one of the types of the degrees mentioned?

(b) How many people had an undergraduate degree in science but no other degree?

3. How many integers between 1 and 250 (inclusive) are:

(a) divisible by 4, 6, or 15?

(b) divisible by 4, 6, and 15?

4. How many integers between 1 and 1000 (inclusive) are:

(a) not divisible by 2, 3, 5, or 7?   
(b) not divisible by 2, 3, 5, and 7?   
(c) are divisible by only 2 of the numbers: 2, 3, 5, or 7?

5. A club has 10 members; how many ways can they choose a slate of 4 oﬃcers?   
 (president, vice, secretary, and treasurer)

6. In how many ways is it possible to sit seven knights at a round table if • Friday, Saturday, and Sunday insist on sitting together? • Wednesday refuses to sit next to Saturday or Sunday?

7. How many 12 digits 0-1 strings contain precisely ﬁve 1’s?

8.. How many ﬁve-card hands dealt from a standard deck of 52 playing cards are all of the same suit?