

Assignment 7: Part 2: 9.4: 6, 7, 16, 27

Sunday, February 19, 2017 7:30 PM

6. a. Given any set of 7 integers, must there be two that have the same remainder when divided by 6? Why?

b. Given any set of 7 integers, must there be two that have the same remainder when divided by 8? Why?

a. Since the set contains 7 integers, if it is divided by 6, then there can be at most 6 different remainders, meaning there is at least 1 integer that has the same remainder.

Yes

b. Since the set contains 7 integers, if it is divided by 8 then there can be up to 8 different remainders. This is more than in the set thus there are more remainders than integers.

NO

7. Let $S = \{3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$. Suppose six integers are chosen from S . Must there be two integers whose sum is 15, why?

$S = 10$ integers. Suppose 6 are chosen

$$\text{int} + \text{int} = 15$$

5 pairs total.

Since there are 5 pairs, choosing 6 means you will choose at least 1 pair that adds up to 15, thus it is true that there will be two integers

Yes

Assignment 7: Part 2: 9.4: 6, 7, 16, 27

Sunday, February 19, 2017 7:30 PM

16. How many integers from 1 through 100 must you pick in order to be sure of getting one that is divisible by 5?

100 total integers, divisible by 5

$100/5 = 20$ integers divisible by 5.

80 are not. to guarantee that it is divisible by 5,

81 must be chosen as the next one after 80 will be.

27. In a group of 2000 people, must at least 5 have the same birthday, Why?

2000 people, 12 month, 366 days/year,

Counting leap years, 366 days. It is true for normal years if leap years are true.

$$2000 = 366 \times 5 + 170$$

$$\frac{2000}{366} > 5 = 6 > 5$$

Since we took 2000 divided by the amount of possible birthdays, it gave us a number greater than 5, 6

6 people will share the same birthday.