UNIT 10 EXERCISES 11-15

COMBINATIONS

2012B

12. How many sequences of zeros and/or ones of length 20 have all the zeros consecutive, or all the ones consecutive, or both?

**(A)** 190 **(B)** 192 **(C)** 211 **(D)** 380 **(E)** 382

2014A 12. Two circles intersect at points $A$ and $B$. The minor arcs $AB$ measure $30°$ on one circle and $60°$ on the other circle. What is the ratio of the area of the larger circle to the area of the smaller circle?

**(A)** 2 **(B)** $1+\sqrt{3}$ **(C)** 3 **(D)** $2+\sqrt{3}$ **(E)** 4

2017A 14. Alice refuses to sit next to either Bob or Carla. Derek refuses to sit next to Eric. How many ways are there for the five of them to sit in a row of 5 chairs under these conditions?

**(A)** 12 **(B)** 16 **(C)** 28 **(D)** 32 **(E)** 40

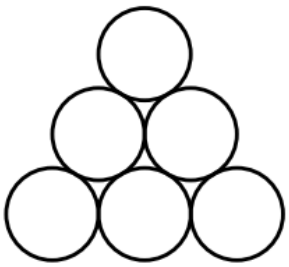
2013A 15. Rabbits Peter and Pauline have three offspring—Flopsie, Mopsie, and Cottontail. These five rabbits are to be distributed to four different pet stores so that no store gets both a parent and a child. It is not required that every store gets a rabbit. In how many different ways can this be done?

**(A)** 96 **(B)** 108 **(C)** 156 **(D)** 204 **(E)** 372

2010B 15. For how many ordered triples $(x, y, z)$ of nonnegative integers less than 20 are there exactly two distinct elements in the set $\{i^x, (1+i)^y, z\}$, where $i = \sqrt{-1}$?

**(A)** 149 **(B)** 205 **(C)** 215 **(D)** 225 **(E)** 235

2017B 13. In the figure below, 3 of the 6 disks are to be painted blue, 2 are to be painted red, and 1 is to be painted green. Two paintings that can be obtained from one another by a rotation or a reflection of the entire figure are considered the same. How many different paintings are possible?



**(A)** 6 **(B)** 8 **(C)** 9 **(D)** 12 **(E)** 15