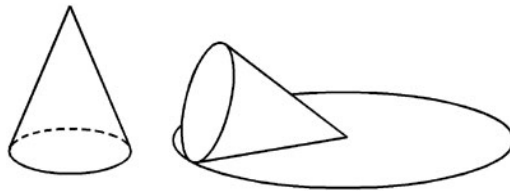


1. _____ What positive number is equal to three times its reciprocal? Express your answer in simplest radical form.

2. _____ million Seven-digit phone numbers are typically written as a three-digit integer followed by a four-digit integer, separated by a dash, for example, 468-1012. The first digit cannot be a zero or a one, so there are $8 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 8$ million possible phone numbers for any given area code (forget for a moment that, for example, 911 cannot be used as the first three digits of a phone number). In Mathland, the same 8 million phone numbers are used for each area code, however, phone numbers are dialed with the dash. Phone numbers can include a dash between any pair of digits (or no dash at all), creating distinct phone numbers. For example, the phone numbers: 4681012, 468-1012, and 4-6-8-10-12 are different. How many phone numbers are possible for each area code in Mathland? Express your answer in millions.

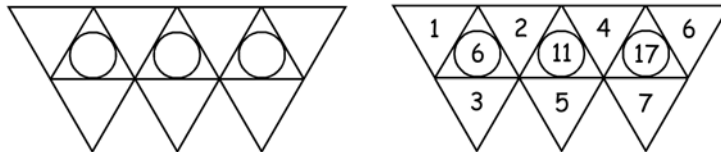
3. _____ The ratio of Paula's age in years to Quinn's age in months is 3:8. The ratio of Quinn's age in years to Rashmi's age in months is 5:21. What is the ratio of Paula's age in years to Rashmi's age in years? Express your answer as a common ratio $p:r$ in simplest terms.

4. _____ A 12-inch tall right cone whose base has a 10-inch diameter is tipped over and rolled on its side until the base of the cone completes one revolution around its apex, tracing the path as shown. How many rotations does the base of the cone complete in one such revolution? Express your answer as a common fraction in simplest form.



5. _____ The children's section in a cycle shop has an equal number of bicycles and tricycles for sale. If there are 54 more wheels than there are cycles, what is the total number of bicycles and tricycles are for sale in the children's section?

6. _____ Each of the digits 1 through 7 is placed into one of the empty triangles in the diagram below. The sum of the digits in the three adjacent triangles is written in each of the three circles as shown in the example. The three numbers contained in the circles are then written in order to form an integer. What is the least possible value of this integer? In the example shown, the number formed is 61,117.



7. _____ What is the sum of the digits in the product of 1,010,101,010,101 and 23?

8. _____ How many arrangements of the letters in the word ARRANGE contain no double-letters?