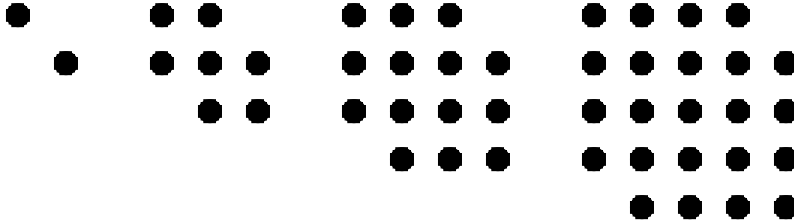


2003 Washington State Math Championship

Unless a particular problem directs otherwise, give an exact answer or one rounded to the nearest thousandth.

Potpourri - Grade 7

1. The first 4 dot patterns are shown. How many dots are in the tenth pattern?



2. What time is it 2003 minutes after 8:03 p.m. (20:03 in military time)?
3. What is the sum of the prime factors of 19,062,043?
4. Using the numbers 2, 3, 4, and 5 each once to replace the variables w , x , y , and z , what is the maximum possible value for the expression $w + x \cdot y^z$?
5. Of the 28 students in the class 14 have cell phones and 11 have graphing calculators. If 7 of these students have both devices, how many have neither?
6. In how many ways can change for a quarter be made using standard U.S. coins?

7. The eight rules for each new row of the pattern are as follows:

$\begin{array}{c} \square \\ \square \end{array} \quad 1 \quad \begin{array}{c} \square \square \\ \square \square \end{array} \quad 1 \quad \begin{array}{c} 0 \square \square \\ \square \square \end{array} \quad 0 \quad \begin{array}{c} 1 \square \square \\ \square \square \end{array} \quad 0 \quad \begin{array}{c} 0 \square \square \\ \square \square \end{array} \quad 1 \quad \begin{array}{c} 1 \square \square \\ \square \square \end{array} \quad 1 \quad \begin{array}{c} 0 \square \square \\ \square \square \end{array} \quad 0 \quad \begin{array}{c} 1 \square \square \\ \square \square \end{array} \quad 0 \quad \begin{array}{c} 0 \square \\ \square \end{array}$

The pattern so far is

```

0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 0 1 1 1 1 0 0 0 0 0 0
0 0 0 0 0 0 1 1 0 0 1 0 0 0 1 0 0 0 0 0
0 0 0 0 0 1 1 0 1 1 1 1 0 1 1 1 0 0 0 0
0 0 0 0 1 1 0 0 1 0 0 0 0 1 0 0 1 0 0 0
0 0 0 1 1 0 1 1 1 1 0 0 1 1 1 1 1 0 0 0
0 0 1 1 0 0 1 0 0 0 1 1 1 0 0 0 0 1 0 0
0

```

What sequence of 19 0's and 1's completes the next row of the pattern?

8. If all multiples of 5 and all multiples of 7 are removed from a list of integers from 1 to 200, how many numbers are left?
9. The ancient Egyptian mathematical system allowed only fractions with numerator 1 (except for $\frac{2}{3}$). For example, $\frac{7}{8} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$. If $\frac{137}{360}$ is expressed a sum of three fractions each with a numerator of 1 and different denominators, what is the least possible sum of the denominators?
10. A cylindrical can of tennis balls with a $2\frac{3}{4}$ -inch diameter contains 3 spherical tennis balls stacked one on top the other. What percentage of the space in the cylinder is also contained within the spheres? [Answer to the nearest tenth of a percent.]