

Worksheet 6
A&S100
18 October 2002

Name: _____

1. Develop a divisibility test for 64 and prove that your test works.
2. What do you suppose would be a good test for divisibility by 2^k where k is a positive integer?
3. Prove: A positive integer $N = a_m a_{m-1} \cdots a_1 a_0$ is divisible by 25 if and only if the two digit number $a_1 a_0$ is divisible by 25.
4. How are the divisibility tests for $4 = 2^2$ and $25 = 5^2$ similar? Does a similar divisibility test work for $9 = 3^2$? Why or why not?
5. Find a UPC number for which the check digit does not detect the transposition of two adjacent digits.
6. The following problem was taken from
<http://www.cut-the-knot.com/Generalization/div9.shtml>
a web site by Alexander Bogomolny.

Can you find the missing digit in the following equation?

$$5109094x171709440000 = 21 \times 20 \times 19 \times 18 \times \dots \times 3 \times 2 \times 1$$