Algebra Connections

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Divisibility Rules

There are several methods for testing the divisibility of a number without actually performing the division. A great interactive tutorial is at:

http://www.oswego.org/mtestprep/math8/a/divisibilityrulesl.cfm (interactive tutorial)

Dividing by 2

- All even numbers are divisible by 2. E.g., all numbers ending in 0,2,4,6 or 8.

Dividing by 3

- Add up all the digits in the number.
- Find out what the sum is. If the sum is divisible by 3, so is the number
- For example: 12123 (1+2+1+2+3=9) 9 is divisible by 3, therefore 12123 is too!

Dividing by 4

- Are the last two digits in your number divisible by 4?
- If so, the number is too!
- For example: 358912 ends in 12 which is divisible by 4, thus so is 358912.

Dividing by 5

- Numbers ending in a 5 or a 0 are always divisible by 5.

Dividing by 6

- If the Number is divisible by 2 and 3 it is divisible by 6 also.

Dividing by 7 (2 Tests)

- Take the last digit in a number.
- Double and subtract the last digit in your number from the rest of the digits.
- Repeat the process for larger numbers.
- Example: 357 (Double the 7 to get 14. Subtract 14 from 35 to get 21 which is divisible by 7 and we can now say that 357 is divisible by 7.

OR

- Take the number and multiply each digit beginning on the right hand side (ones) by 1, 3, 2, 6, 4, 5. Repeat this sequence as necessary
- Add the products.
- If the sum is divisible by 7 - so is your number.
- Example: Is 2016 divisible by 7?
- $6(1) + 1(3) + 0(2) + 2(6) = 21$
- 21 is divisible by 7 and we can now say that 2016 is also divisible by 7.

Dividing by 8

- This one's not as easy, if the last 3 digits are divisible by 8, so is the entire number.
- Example: 6008 - The last 3 digits are divisible by one, therefore, so is 6008.

Dividing by 9

- Almost the same rule and dividing by 3. Add up all the digits in the number.
- Find out what the sum is. If the sum is divisible by 9, so is the number.
- For example: 43785 (4+3+7+8+5=27) 27 is divisible by 9, therefore 43785 is too!

Dividing by 10

- If the number ends in a 0, it is divisible by 10.

Seem like too much? Easy does it – work on mastering the rules for the prime numbers: 2, 3, 5, and 7 (**Note:** 7's are common football scores).

Story Problems: Divisibility

1. A scholarship fund has $213,198. Can the money be awarded equally among 8 students?
2. 2465 girls signed up to live in a dormitory. If each room can hold 3 girls, will each room be completely filled after all the girls have been assigned a room?
3. Nine teachers receive 190 file folders. Can each teacher have the same number of folders?
4. Professor Fields spilled in on a memo from the math department. Find the missing Digit:

   TO: All Math Faculty

   9 classes have been scheduled for this year. Each class has an equal number of students. The total number of students is 4__25.
5. There are 128 students enrolled in a math course. Can the students be divided into 4 equal classrooms?
6. The headwaiter at the restaurant forgot the last digit of the number of people in a banquet party. The party will be seated in tables of 9. Find the missing digit. It will be a party of 167__
7. The English department has 190 pens. Can 8 teachers receive the same number of pens?
8. The school health center has 124 boxes of gauze. Can each of the 4 wards receive an equal number of boxes?
9. A table seats 4 people. Can 1,5024 people sit at these tables and have them all be full?
10. Five students washed cars all day Saturday. They made $108.00. Can they divide this amount evenly?
11. Could three students divide $108.00 evenly?
12. Could 4 students divide $108.00 evenly?