Factoring numbers and Variables

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1 Prime factorization

1.1 Prime numbers vs composite numbers

1.2 Rules of Divisibility

Number	Rule
2	The number ends in 0, 2, 4, 6, 8
4	The last two digits form a number divisible by 4
8	The last three digits form a number divisible by 8
3	The sum of the digits is a number divisible by 3
9	The sum of the digits is a number divisible by 9
6	The number is divisible by both 2 and 3
12	The number is divisible by both 3 and 4
5	The number ends in 0, 5
10	The number ends in 0
11	The difference between the sums of the alternating digits is divisible by 11.

Question 1. Prove divisibility rules for 3, 9; 4, 8; 11

Question 2. Find prime factorization of 360 and 1,056

Question 3. Simplify $\frac{120}{165}$; $\frac{100}{243}$

Question 4. Simplify $\frac{48x^3y^2z}{84xy^2z^3}$

Question 5. Simplify $\frac{5{,}400{,}000{,}000{,}000{,}000{,}000}{711{,}000{,}000{,}000{,}000{,}000{,}000{,}000}$

Question 6. Find the GCF and write the factorization

$$12x^2y^4 + 16xy^3 - 20x^3y^2 =$$

$$40a^5x + 80z^5y - 120a^5z =$$

$$18x^2y + 25z^3 + 49z^2 =$$