

Name: _____

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Worksheet - August 28

MAT 3501

Fall 2018

1. If d, m, n, a, b are all integers, show that if $d|m$ and $d|n$, then $d|am + bn$.
2. Pick three distinct digits. Write all possible 3-digit numbers you can form with the three chosen digits and then find the sum of all these numbers. Divide the result by the sum of your digits. Compare what you get and then find an algebraic explanation.
3. For numbers in base 10, state and prove a divisibility criterium by 25.
4. (adapted Pb. 10, section 2.2) True or False? Justify your answer. "Let $a_1, a_2, \dots, a_{2018}$ be integers. If the product $a_1 a_2 \dots a_{2018}$ is an odd number, then the sum $a_1 + a_2 + \dots + a_{2018}$ is an even number."
5. (adapted Pb. 6, section 2.3) A student claims to have made the discovery that if you take any two odd numbers then the difference of their squares is divisible by 8. She shows the example $9^2 - 5^2 = 56$, which is divisible by 8 and claims her statement is always true. Is her example a proof for her claim? Is her claim true? Justify.