Math 6 Unit 1 worksheet: The sieve of Eratosthenes

Name _____ Date _____ Period _____

1. Decide whether each number is prime, composite or neither. For each composite number, write it as a product of two whole numbers greater than 1.

(a) 1 (b) 29 (c) 51 (d) 35

(e) 57 (f) 73 (g) 65 (h) 97

2. The sixth grade has 203 students. For the class photo they will stand in equal rows, with more than one row and more than one student in each row. What is the fewest number of rows they can use, and how many students stand in each row?

3. Write the numbers 1 to 100 ten to a row, so the columns are the numbers ending in 1, in 2, and so on up to 0.

(a) After the rounds for 2 and 5, which columns still hold lit numbers other than 2 and 5? Explain why every prime greater than 5 ends in 1, 3, 7 or 9.

(b) Lucas says every number ending in 1, 3, 7 or 9 is prime. Give a number that shows he is wrong, and name the round that puts it out.

4. Ethan multiplies the first four primes and adds 1: $2 \times 3 \times 5 \times 7 + 1 = 211$.

(a) Explain why none of 2, 3, 5 and 7 divides 211, without dividing.

(b) Which other primes must Ethan test to decide whether 211 is prime? Test them, and decide.

5. (a) Priya runs the sieve on a board from 1 to some number. Her board needs exactly the rounds for 2, 3 and 5, and no others. What is the smallest number her board could end at? The largest?

(b) Omar's board needs exactly six rounds. What is the smallest number his board could end at? The largest?

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