Math 6 Unit 1 quiz 1: Tests for three and nine, The sieve of Eratosthenes, Prime factorization

Name _____ Date _____ Period _____

8 questions, 21 points

1. Lily's class folds paper cranes for a display. The first team has 1,368 cranes and the second team has 2,457. Jin adds the two counts and gets a total of 3,815. Use digit sums to show that Jin's total is wrong, without adding again. (2 points)

2. Each number is composite. Find its smallest prime factor, and write the number as that prime times another whole number. (3 points)

(a) 259 (b) 341 (c) 323

3. Which is larger, $2^4 \cdot 3$ or $2 \cdot 3^3$? By how much? (2 points)

4. Naomi has 87,835 oranges at a citrus packing house and wants to pack all of them in bags, every bag the same size. Without dividing, find: (3 points)

(a) the fewest oranges Naomi must take away so that bags of 9 use every orange that is left;

(b) the fewest oranges Naomi must add so that bags of 3 use every orange.

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5. Ryan's padlock opens with a four-digit code that uses the digits 1, 3, 6 and 8, each once, but he has forgotten their order. (3 points)

(a) Explain why every code Ryan could make is divisible by 9.

(b) His sister says one of the digits is 7, not 8. If she is right, is any possible code divisible by 3? Explain.

6. Hiro runs the sieve on a board from 1 to 100. (3 points)

(a) The lanterns round 3 puts out are 9, 15, 21, 27, ... Explain why they go up in sixes and not in threes.

(b) How many lanterns does round 3 put out on his board?

(c) Which of the lanterns 57, 75 and 85 does round 3 put out?

7. Part of a ladder has been rubbed out. The letters A, B, C and D stand for the missing entries. (2 points)

Divide by	Number
2	A
B	805
7	C
D	23
	1

(a) Find A, B, C and D.

(b) Write the prime factorization of A, smallest prime first.

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8. Mia is running the sieve on a board from 1 to 70. The board shows her work so far: she put out 1, circled 2 and 5, and shaded and struck through every number she has put out. She has made a mistake. (3 points)

~~1~~	(2)	3	~~4~~	(5)	~~6~~	7	~~8~~	9	~~10~~
11	~~12~~	13	~~14~~	~~15~~	~~16~~	17	~~18~~	19	~~20~~
21	~~22~~	23	~~24~~	~~25~~	~~26~~	27	~~28~~	29	~~30~~
31	~~32~~	33	~~34~~	~~35~~	~~36~~	37	~~38~~	39	~~40~~
41	~~42~~	43	~~44~~	~~45~~	~~46~~	47	~~48~~	49	~~50~~
51	~~52~~	53	~~54~~	~~55~~	~~56~~	57	~~58~~	59	~~60~~
61	~~62~~	63	~~64~~	~~65~~	~~66~~	67	~~68~~	69	~~70~~

(a) Which round did Mia skip? Name one lit number that shows it.

(b) Mia runs the skipped round. Which numbers does it put out?

(c) After that, which rounds does the board still need?

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