Name _____ Date _____

Binary Numbers: Counting with 0 and 1

Directions: A binary number uses only the digits 0 and 1. Reading from the right, the place values of a binary number are 1, 2, 4, 8, 16, 32, 64 and 128. A regular number is a number written the usual way, with the digits 0 to 9.

1. A light panel on a robot shows the binary number 1100. What regular number does the binary number 1100 stand for?

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2. Rina wants to show the regular number 13 on her binary light panel. Which binary number should she show?

A. 1110 B. 1001 C. 1011 D. 1101

3. Match each binary number to the regular number it stands for.

Write the letter of the matching answer on each line.

1. _____ Binary number 0110
2. _____ Binary number 1111
3. _____ Binary number 0101
4. _____ Binary number 0011

A. 6
B. 3
C. 5
D. 15

4. Jonah lines up five cards with 16, 8, 4, 2 and 1 dots, from left to right. A card facing up stands for 1 and a card facing down stands for 0, so the cards show a binary number. His cards read: up, down, up, up, down. What regular number do his cards stand for?

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5. Pablo is counting up in binary. Which binary number comes right after the binary number 0111?

A. 1000 B. 0112 C. 1110 D. 10000

6. A computer stores numbers in bytes. A byte is 8 bits, so it holds an 8-digit binary number. One byte holds the binary number 11001010. What regular number does the binary number 11001010 stand for?

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7. Here is another way to find the value of a binary number. Use it on the binary number 110101. It has 6 digits, so step 2 runs 6 times.

1. Set total to 0.
2. For each digit of the binary number, from left to right: double total, then add that digit to total.

What is the value of total after step 2 uses the last digit?

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8. Lucy's game saves each score as a 6-digit binary number. What is the largest regular number that a 6-digit binary number can stand for?

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