Math 5b, homework 5.

1. Add one digit to the left and one digit to the right of the number 15 so that the resulting number is divisible by 15.

2. Write numbers 51 and 175 in binary system.

3. Write the numbers, written in the binary system in decimal system:

    $a.\ 11011011_2;$ $b.\ 10001101_2,$ $c.\ 111111111_2$

4. Can you find out which numbers are multiplied?

$$
\begin{array}{r}
* * \\
\times\ * * \\
\hline
* * \\
+\ * * * \\
\hline
9\ * * *
\end{array}
$$

5. Compare:

   Example: What is greater 31^{11} or 17^{14}?

   We can see that $31 < 32 = 2^5;\ 2^4 = 16 < 17$,

   $$31^{11} < 32^{11} = (2^5)^{11} = 2^{55}$$
   $$(17)^{14} > 16^{14} = (2^4)^{14} = 2^{56}$$

   We can write the following:

   $$31^{11} < 32^{11} = 2^{55} < 2^{56} = 16^{14} < (17)^{14}$$
   $$31^{11} < 17^{14}$$

   a. 127^{23} and 513^{18}
   b. 9997^{10} and 100003^8
   c. 5^{300} and 3^{500}

6. It takes Julia 45 minutes to drive from home to work, and she drives at a speed of 55 miles per hour. How far is her office from her home?

7. Julia's friend Emily lives 2.4 miles from Julia. How much time does Julia need to walk to Emily's house if she walks at a speed of 3 miles per hour?

8. Today, Julia and Emily decided to meet between their houses. They started walking at noon toward each other. At what time will they meet and how far from Julia's house will the meeting point be if Julia is walking at a speed of 2.5 miles per hour and Emily is walking at a speed of 2.3 miles per hour (distance between houses is 2.4 miles)?