MATH 5: HOMEWORK 14
DIFFERENCE OF SQUARES. REVIEW.

0. Solve the following equation: $3 - 5(2 - x) = 18$

1. Do the operations with binary numbers:
$101101 + 110100$
$11011101 - 10010$

2. If $a = 3 \times 10^{-7}$, $b = 5 \times 10^{-5}$, what is a^2? $1/b$? $a^2 \div b^3$?

3. Factor the following number into primes: $99^2 - 9^2$. [Hint: you do not have to compute this number. Rather use the identity $a^2 - b^2 = (a + b)(a - b)$ for any numbers a and b.]

4. Can you find whole numbers a, b such that $a^2 - b^2 = 17$? [Hint: use the formula we talked about in class (and written above), and think what $a - b$ and $a + b$ must be.]

5. For the following problem, you need to know that the speed of light is about $300,000$ km/sec, and one year is about $3 \cdot 10^7$ seconds.

   (a) How long would it take light to travel from Sun to Earth? The distance is about $1.5 \cdot 10^8$ km

   (b) In astronomy, a common unit of distance is a light year: the distance light covers in one year. How many kilometers is it?

   (c) Another common unit of distance in astronomy is a parsec, which is approximately equal to 3×10^{13} km. Can you compute how many parsecs are there in one light year? How many parsecs between Earth and Sun? between Earth and the Andromeda Nebula ($\approx 2{,}000{,}000{,}000{,}000{,}000{,}000{,}000$ km)?

6. Solve (different letters stand for different digits):
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        FORTY
  +       TEN
  +       TEN
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        SIXTY
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