

Math 5b: Homework 13
Homework #13 is due January 21.

Square-Root

The square-root of a is a number whose square is equal to a . For example: the square-root of 25 is 5 because $5^2 = 25$. Notation: square-root of a number, a , is commonly denoted as \sqrt{a} .

Similarly to b^n $(ab)^n = a^n b^n$, $\sqrt{ab} = \sqrt{a}\sqrt{b}$.

For example, $\sqrt{36} = \sqrt{9 \times 4} = \sqrt{9} \times \sqrt{4} = 3 \times 2 = 6$. And we also know that $\sqrt{36} = 6$.

Homework

1. Solve the following equations:

(a) $2(x - 1) = \frac{2}{3}(x + 5)$

(b) $2x - 5(x - 7) = -1$

(c) $\frac{x-2}{x-5} = 3$

2. Do the following arithmetic operations with binary numbers. Do them without converting the numbers to decimal form:

(a) $110101\mathbf{b} + 111011\mathbf{b}$

(b) $10101\mathbf{b} \times 1011\mathbf{b}$

(c) $(10101\mathbf{b} + 1101\mathbf{b}) \times 10110\mathbf{b}$

3. The following is the beginning of a computer file. Can you decode it (assuming it is written in the standard, Latin 1, encoding)?

(a) First, convert to base-10 numbers

(b) **(Optional)** then look up the corresponding letters in the ISO/IEC 8859-1 table online
https://en.wikipedia.org/wiki/ISO/IEC_8859-1

01010100 01101111 01110000 00100000 01110010 01100101 01100011 01110010
01100101 01110100 00001010

4. Write the following expressions as powers with an appropriate base

(a) $\frac{1}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} =$

(b) $1\text{mm} = ?\text{m}$

(c) $1\text{dm} = ?\text{m}$

(d) $1km = ? m$

(e) $\frac{a}{a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a} =$

5. “Jack has at least a thousand books”, said Maria. “No, he has less than a thousand”, said Daniel. He certainly has at least one book”, said Kathy. If it is known that only one of the statements is true, how many books does Jack have?

6. Find the following square-roots. If you cannot find the number exactly, at least say between which two whole numbers the answer is, e.g. between 5 and 6.

(a) $\sqrt{16}$

(b) $\sqrt{81}$

(c) $\sqrt{10,000}$

(d) $\sqrt{10^8}$

(e) $\sqrt{50}$

7. Find (Hint, you do not need to compute the number under the $\sqrt{\quad}$)

(a) $\sqrt{2^6 \times 7^2}$

(b) $\sqrt{\frac{1}{16}}$

(c) $\sqrt{\frac{4}{9}}$