

This document contains explanations of notation and definitions that we may go over quickly in lecture. If you were confused about notation or think you missed a definition, look here!

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- Def An integer n is divisible by integer m if there exists an integer k such that $n = mk$.

We sometimes say " m divides n " to mean the same thing as " n is divisible by m ".

We use the shorthand $m|n$ to say m divides n .

Another equivalent definition of divisibility is that $m|n$ if and only if $\frac{n}{m}$ is an integer.

ex $0 \stackrel{\leftarrow n}{\text{is divisible by}} \stackrel{\leftarrow m}{2}$ because we can choose $k=0$ and write $0 = 2 \cdot 0$.

5 is not divisible by 4 because there is no integer k so that $5 = 4k$.

-33 is divisible by 11 because $-33 = 11 \cdot (-3)$.

• The ellipsis (...) notation in math:

... means "continuing onward in the same manner."

So $1, 2, \dots, 99, 100$ means "all of the integers between 1 and 100."

By convention, we put two items at the start (here, 1 and 2) and two at the end to be very explicit about the pattern. But in general, look at examples and use your own judgment about how to use ...

ex $-100, -98, \dots, -4, -2$ even negative integers between -100 and -2

$\dots -2, -1, 0, 1, 2, \dots$ all integers

$c_0 x_0 + c_1 x_1 + c_2 x_2$ polynomials up to degree 2

$c_0 x_0 + c_1 x_1 + \dots + c_{k-1} x_{k-1} + c_k x_k$ polynomials of degree k

• Exponent math rules.

We can simplify expressions with exponents as long as they share the same base!

ex 5^8 divided by 5^2 is $\frac{5^8}{5^2} = 5^6$.

↑ base

← exponent

$$x^{10} \cdot x^{11} = x^{21}$$

$$\frac{10^k}{10^2} = \frac{10^k}{10^2} = 10^{k-2}$$

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• Def A rational number is a real number that can be expressed as a ratio n/m of integers n and m where $m \neq 0$.

ex 1.2 is rational because we can choose $n=6$ and $m=5$ so that $1.2 = n/m = 6/5$.

-5 is rational because $-5 = -5/1$.

π is not rational.

0.33... is rational because it equals $1/3$.

- Def The absolute value of a number x , written $|x|$, is the distance from x to 0, disregarding the sign of x .

ex $|5| = 5$

$$|-5| = 5$$

$$|-1.2| = 1.2$$

- Def Given a proposition of the form "if a then b ", its converse is the proposition "if b then a ".