Math 10 Chp 4 Reference/Review

Note Title 2016-09-29

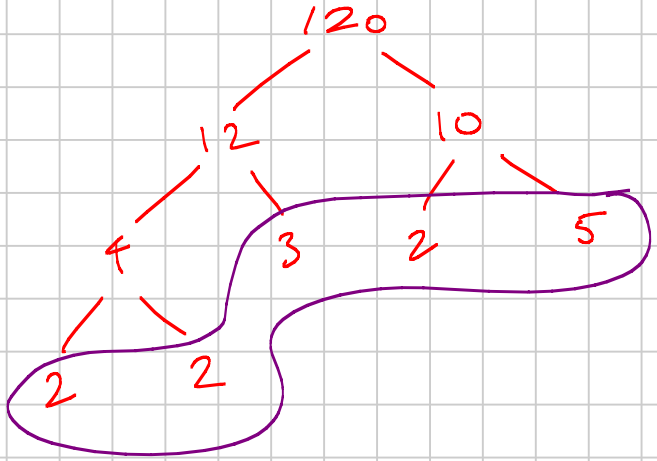
Prime factorization! or just factorization.

2 - if even (ends in 0, 2, 4, 6, 8)
3 - if sum of digits is divisible by 3
4 - if last 2 digits is divisible by 4
5 - if it ends in 0 or 5.
6 - divisible by 2 & 3.
7 - it's complicated
8 - if last 3 digits are divisible by 8
9 - if sum of digits is divisible by 9
10 - if it ends in 0.

Square Roots - factorize, for pairs - pull out as a single. - leave the rest inside the radical

Cube Roots - factorize, for triplets - pull out as a single. - leave the rest inside the radical.

Factor Tree - factors are in the leaves.

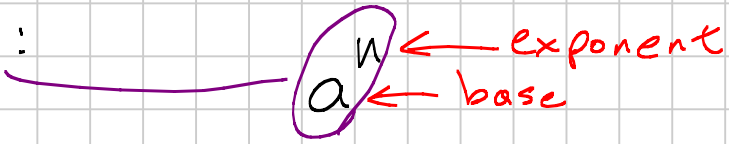


Cube Root on calculators without the button

$\sqrt[3]{8} = 8 \,\hat{}\, (1 \div 3)$

Can also be: $x^{\square}$ or y^x

Powers:



Powers as Repeated Mutiplication (Whole number exponents): $a^5 = a \cdot a \cdot a \cdot a \cdot a$

Powers as Repeated Division (Integer exponents):

$$a^{-4} = \frac{1}{a \cdot a \cdot a \cdot a}$$

Power Laws:

$(a^m)^n = a^{m \cdot n}$

$a^m a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$

$(ab)^n = a^n b^n$

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$

$a^0 = 1, a \neq 0$

$a^{-n} = \frac{1}{a^n}, a \neq 0$

$\frac{1}{a^{-n}} = a^n, a \neq 0$

Word Problems: You will be supplied with a formula such as $P = 8172(2)^n$. If the base is >1, then it is a growth problem. If the base is >0 & <1, then it is a decay problem. 'n' is normally in terms of a fixed amount of time such as hours, days, years.

Doubling Formula:

$P = P_0(2)^n$ ← time

↖ initial value

Half-life formula:

$A = A_0(1/2)^n$ ← time

↖ initial value

Logarithmic Formulas (to calculate exponent):

$10^n = b \iff \log b = n$

$\log a^n = n \log a$

Solving for Carbon-14 half-life.

$A = A_0(1/2)^{n/5730}$ ← years

← initial amount

$n = \frac{5730 \cdot \log(A \div A_0)}{\log(1 \div 2)}$

Radicals:

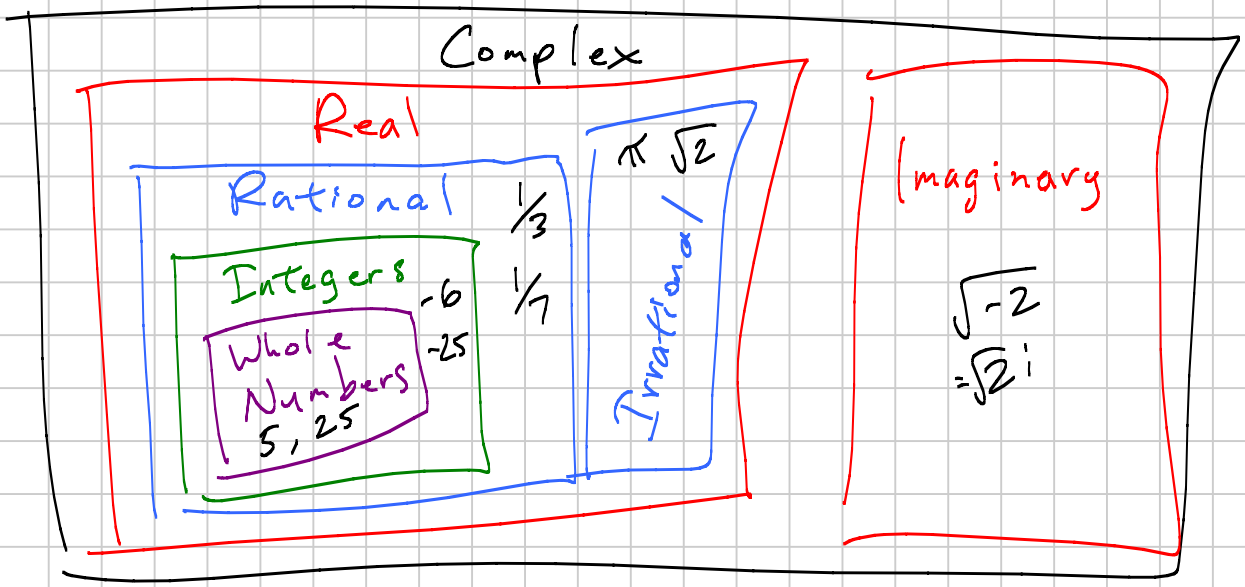
$\sqrt[n]{x^m} = x^{m/n}$ Use this to convert between radical and rational exponent.

Mixed radicals - we factor out all perfect squares, cubes, ...

Entire radicals - we bring in all coefficient inside the radicand.

To order radicals, you will need to convert them all to entire radicals of the same index or decimals.

Number Sets


Complex
Real
Rational
1/3
Integers
-6
1/7
Whole Numbers
-25
5, 25
Irrational
π √2
Imaginary
√-2
=√2 i