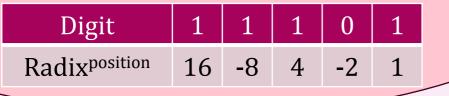
Place Value & Radices

<u>Base x</u> The base x number of 162.25:										
Digit	1	6	2	2	5					
Position	2	1	0	-1	-2					
Value	1x ²	6x ¹	2x ⁰	2x-1	5x ⁻²					

<u>x is the "radix"</u> To find the value of a number, we do the sum of digit*radix^{position} for each digit. We also call the radix a base

We typically use base 10, but we may use binary (base 2) These work in the same way, 13 in this base is 1101.

<u>So how would that work with base (-2)?</u> Simply put, we use the same digits as in base 2, but we use subtraction to form some numbers, 13 is shown below



<u>And decimals?</u> o.5 is just 2^{-1} , and $(2^{-1})^{-1} = 2$, so we just flip it at the decimal point!

Surd bases

<u>Take base $\sqrt{2}$, how would you expect that to work?</u> Well, given that $(\sqrt{x})^{2y} = x^{y}$, we can just use the regular base 2, but with a 0 between each digit, unless we want to display a multiple of $\sqrt{2}$ itself.

<u>i?</u> *i*, or the imaginary unit is defined as √(-1). This means that when we apply powers to it, we get alternations of (-I),(-R),(+I), & (+R). {where R denotes a real number, and I denotes an imaginary one.} This results in the representation of13-13.5*i* in base 2*i* to be as below.

Digit	1	2	1	2	1	3
Radixposition	16	- 8i	-4	2 <i>i</i>	1	-0.5 <i>i</i>

<u>Base 1</u>



i, (https://www.oed.com/search/dictionary/?q=imaginary+number&tl=true) Unary, (https://oeis.org/wiki/Natural_numbers, in_bases_1_through_10#cite_ref-1 {Notes section}) Radices, (pp. 13–14. ISBN 978-1-292-02468-4) Negative Integer Bases, (https://brilliant.org/wiki/negative-integer-number-base/)