

# Submission Rules

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## Intro

While numbers to the power of another are well known in mathematics, I have discovered a new addition to the field of mathematics, and hope it will open the doors to many new avenues for mathematicians, scientists and engineers of the future. The concepts are simple to understand and to use. I have found them most useful in a variety of areas of mathematics thus far.

First the definitions / analogies:

**Submission: Power :: Annarithm: Logarithm**

**Submission: Power :: Opponent: Exponent**

So, if one has effectively worked with logarithms, exponents or any number to the power of another, the concept of annarithms is as straightforward as that.

## Submission

To *raise* something to the **power of 5** (for instance), one gets...

$$x^5 \text{ (or } x^5) = x * x * x * x * x$$

Where the value of x is multiplied by itself 5 times.

**The *lower* something to the submission of 5**, one gets...

$$x_5 \text{ (or } x_5) = (((x / x) / x) / x) / x \tag{1}$$

Thus,

$$x_2 \text{ (or } x_2) \text{ always} = 1 \tag{2}$$

$$x_3 \text{ (or } x_3) \text{ always} = 1 / x \tag{3}$$

$$x_\infty \text{ (or } x_\infty) \text{ always} = 0 \tag{4}$$

Submission works for all numbers, positive, negative, fractions, complex or imaginary. By connecting Submission Rules with Power Rules, it can be shown that:

$$x_a \text{ (or } x\_a \text{ or } \text{opp}_x(a)) = x^{a-2} \quad (5)$$

Example 1.

Let:

$$\begin{aligned} x &= \pi \\ a &= 2 \frac{1}{2} \end{aligned}$$

$$\pi_{2 \frac{1}{2}} \text{ (or } \pi\_2 \frac{1}{2} \text{ or } \text{opp}_\pi(2 \frac{1}{2})) = \pi^{\frac{1}{2}} = \sqrt{\pi} \quad (6)$$

## Annarithms

As  $e$  is the base of natural logarithms, it is also the base of natural annarithms.

An annarithm is expressed as **ann<sub>x</sub>(a)**. A natural annarithm with a base  $e$  is simply **ann<sub>e</sub>(a)**. If ever there is no mention to the base  $e$ , such as **ann(a)**, then it can be assumed to be natural; the same can be considered for opponents in the section above.

It can be shown:

$$a_x \text{ (or } a\_x \text{ or } \text{ann}_x(a)) = a^{2-x} \quad (7)$$

Example 2.

Let:

$$\begin{aligned} x &= \pi \\ a &= 1 \frac{1}{2} \end{aligned}$$

$$1 \frac{1}{2}_\pi \text{ (or } 1 \frac{1}{2}\_\pi \text{ or } \text{ann}_\pi(1 \frac{1}{2})) = \pi^{\frac{1}{2}} = \sqrt{\pi} \quad (8)$$

Example 3.

Let:

$$x = 1^{1/2}$$

$$a = -1$$

$$-1_{1/2} \text{ (or } -1_{-1/2} \text{ or } \text{ann}_{1/2}(-1)) = i = \sqrt{-1} \quad (9)$$

Example 4.

Let:

$$x = 2 + \pi i$$

$$a = e \text{ (Euler's Number)}$$

$$e_{2 + \pi i} \text{ (or } e_{-(2 + \pi i)}) = \pi i = \log_e(-1) \quad (10)$$

Example 4.

Let:

$$x = \infty$$

$$a = e \text{ (Euler's Number)}$$

$$e_{\infty} \text{ (or } e_{-\infty}) = 0 = \log_e(1) = 2\pi i \quad (11)$$

## Other Rules

The rules below are always being expanded upon. More are sure to come, as mathematicians discover more rules based on the information above.

**Submission Rule 1**

$$x_m / x_n = x^{(n - m)} \quad (12)$$

$$= 1 / x^{(m - n)} \quad (13)$$

**Submission Rule 2**

$$x_m * x_n = x^4 / x^{(m + n)} \quad (14)$$

$$= x^{(7)} / ( x^{(m + n)} * x^3 ) \quad (15)$$

**Submission Rule 3**

$$\text{opp}_e (m) / \text{opp}_e (n) = e^n / e^m \quad (16)$$

$$= 1 / e^{(m-n)} \quad (17)$$

$$= e^{(n-m)} \quad (18)$$

$$= 1 / (\text{opp}_e (n) / \text{opp}_e (m)) \quad (19)$$

**Submission Rule 4**

$$\text{ann}_e (e^{(a - 2)}) = (e^{(a - 2)})^{(2 - e)} \quad (20)$$

$$= \log_e (e^{(a - 2)}) + 2 \quad (21)$$

$$= a \quad (22)$$

**Submission Rule 5**

$$\log_e (\text{opp}_e (a)) = \log_e (1 / e^{(\text{opp}_e (a))}) \quad (23)$$

$$= a - 2$$

(24)