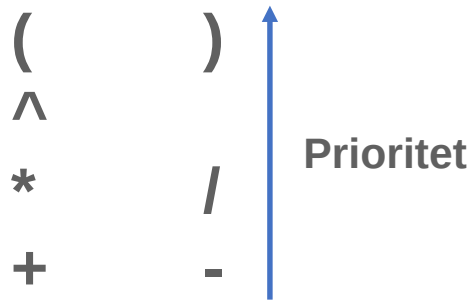
Tall

Tallmengder	$N \subset N_0 \subset Z \subset Q \subset R \subset C$

Binære operasjoner



Kommutativ lov	Addisjon	$a+b = b+a$
Kommutativ lov	Multiplikasjon	$a*b = b*a$
Assosiativ lov		$a+(b+c) = (a+b)+c$
Distributiv lov		$a*(b+c) = a*b+a*c$

Komplekse tall

Imaginær enhet

$$i = \sqrt{-1}$$

Komplekst tall

$$z = x + iy \qquad z = r(\cos\theta + i\sin\theta) \qquad z = re^{i\theta}$$

Kompleks konjugering

$$z = x - iy \qquad z = r(\cos\theta - i\sin\theta) \qquad z = re^{-i\theta}$$

Addisjon / Subtraksjon

$$z = z_1 \pm z_2 = (x_1 \pm x_2) + i(y_1 \pm y_2)$$

Multiplikasjon

$$z = z_1 \cdot z_2 = r_1 r_2 e^{i(\theta_1+\theta_2)} = r_1 r_2 \left[\cos(\theta_1+\theta_2) + i\sin(\theta_1+\theta_2)\right]$$

Divisjon

$$z = \frac{z_1}{z_2} = \frac{r_1}{r_2} e^{i(\theta_1-\theta_2)} = \frac{r_1}{r_2}\left[\cos(\theta_1-\theta_2) + i\sin(\theta_1-\theta_2)\right]$$

Potenser

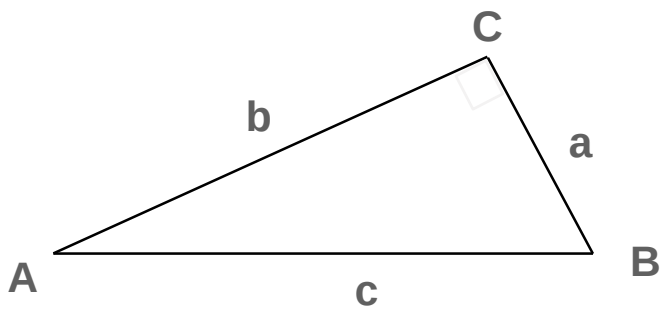
$$z^n = r^n e^{in\theta} = r^n\left[\cos(n\theta) + i\sin(n\theta)\right]$$

Røtter

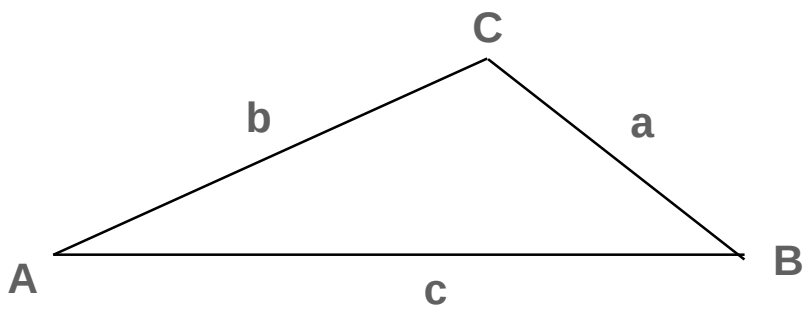
$$z^{\frac{m}{n}} = r^{\frac{m}{n}} e^{i\frac{m}{n}(\theta+2k\pi)} = r^{\frac{m}{n}}\left[\cos\left(\frac{m}{n}(\theta+2k\pi)\right) + i\sin\left(\frac{m}{n}(\theta+2k\pi)\right)\right] \qquad k = 0, 1, 2, \ldots, n-1$$

Pythagoras

$$c^2 = a^2 + b^2$$



$$c^2 = a^2 + b^2 - 2ab\cos C$$



Kvadratsetninger

1. $(a+b)^2 = a^2 + 2ab + b^2$

2. $(a-b)^2 = a^2 - 2ab + b^2$

3. $(a-b)(a+b) = a^2 - b^2$

Potenser / Kvadratrøtter

Definisjon:

$$a^n = \underbrace{a \cdot a \cdot a \cdot \ldots a}_{n \text{ faktorer}}$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

Regler:

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

$$\frac{a^n}{a^m} = a^{n-m}$$

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

$$(a \cdot b)^n = a^n \cdot b^n$$

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

Potenser / Kvadratrøtter

Definisjon:

$$x = \sqrt[n]{a} \quad \Leftrightarrow \quad a = x^n \qquad a > 0, \;\; n \text{ naturlig tall}$$

$$a^{\frac{1}{n}} = \sqrt[n]{a} \qquad a > 0, \;\; n \text{ naturlig tall}$$

$$a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m \quad \text{eller} \quad a^{\frac{m}{n}} = \sqrt[n]{a^m} \qquad a > 0, \;\; n \text{ naturlig tall}, \;\; m \text{ helt tall}$$

$$a^x = \lim_{q \to x} a^q \qquad x \text{ irrasjonalt tall } q \in Q$$