

$$((1-i\sqrt{3})/(1+i))^{13}$$

$$((1-i\sqrt{3})(1-i)/(1+i)(1-i))^{13}$$

$$((1-i\sqrt{3}-i-\sqrt{3})/2)^{13}$$

$$(((1-\sqrt{3})+i(-1-\sqrt{3}))/2)^{13}$$

$$z=(1-\sqrt{3})/2+i(-1-\sqrt{3})/2$$

$$z=|z|(\cos a+i\sin a)$$

$$|z|=\sqrt{a^2+b^2}=\sqrt{((1-\sqrt{3})/2)^2+((-1-\sqrt{3})/2)^2}=\sqrt{((1-2\sqrt{3}+3+1+2\sqrt{3}+3))/4}$$

$$4)=\sqrt{(1+3+1+3)/4}=\sqrt{2}$$

$$p=(1-i\sqrt{3})$$

$$q=1+i$$

для p

$$p=|p|(\cos a+i\sin a)$$

$$|p|=\sqrt{1+\sqrt{3}^2}=2$$

$$\cos a=1/2$$

$$\sin a=-\sqrt{3}/2$$

$$a=-\pi/3$$

$$p=2(\cos(-\pi/3)+i\sin(-\pi/3))$$

$$p^{13}=2^{13}(\cos(-13\pi/3)+i\sin(-13\pi/3))=$$

$$=2^{13}(\cos(-\pi/3)+i\sin(-\pi/3))=8192(1/2+i\sqrt{3}/2)$$

для q

$$q=|q|(\cos b+i\sin b)$$

$$q=\sqrt{2}$$

$$\cos b=\sqrt{2}/2$$

$$\sin b=1/\sqrt{2}=\sqrt{2}/2$$

$$q=\sqrt{2}(\cos(\pi/4)+i\sin(\pi/4))$$

$$q^{13}=\sqrt{2}^{13}(\cos(13\pi/4)+i\sin(13\pi/4))=64\sqrt{2}(\cos(13\pi/4)+i\sin(13\pi/4))=$$

$$=64\sqrt{2}(\cos(5\pi/4)+i\sin(5\pi/4))=64\sqrt{2}(-\sqrt{2}/2-i\sqrt{2}/2)$$

$$p/q=\{8192(1/2+i\sqrt{3}/2)\}/\{64\sqrt{2}(-\sqrt{2}/2-i\sqrt{2}/2)\}=2^6(1+i\sqrt{3})/(-1-i)=$$

$$=-64((1+i\sqrt{3})(1-i))/((1+i)(1-i))=-64(1+i\sqrt{3}-i+\sqrt{3})/2=-32(1+\sqrt{3}+i(\sqrt{3}-1))$$

$$4\sqrt[4]{z}$$

$$w=4+0i$$

$$w=|w|(\cos a+i\sin a)$$

$$|w|=4$$

$$\cos a=1$$

$$\sin a=0$$

$$w=4(\cos 0+i\sin 0)$$

$$z^4=w$$

$$z=|z|(\cos b+i\sin b)$$

$$z^4=|z|^4(\cos 4b+i\sin 4b)=4(\cos 2\pi k+i\sin 2\pi k)$$

$$4b=2\pi k \quad k=0, 1, 2, 3$$

$$b_1=0$$

$$b_2=\pi/2$$

$$b_3=\pi$$

$$b_4=3\pi/2$$

$$|z|=4\sqrt[4]{z}$$

$$z_1=\sqrt{2}(\cos 0+i\sin 0)=\sqrt{2}(1+i0)=\sqrt{2}$$

$$z_2=\sqrt{2}(\cos \pi/2+i\sin \pi/2)=\sqrt{2}(0+i)=i\sqrt{2}$$

$$z_3=\sqrt{2}(\cos \pi+i\sin \pi)=\sqrt{2}(-1+i0)=-\sqrt{2}$$

$$z_4=\sqrt{2}(\cos 3\pi/2+i\sin 3\pi/2)=\sqrt{2}(0-i)=-i\sqrt{2}$$