Revisão PSC 3

UFAM PSC 2020

Seja r um número real tal que o número complexo é um número real.

$$z = \frac{9 - ir}{3 - i} \qquad \boxed{z = 3}$$

Então, o valor de r é igual a:

a) 1

~~b)~~ 3

c) −3

d) 9

e) −9

$$\boxed{i^2 = -1}$$

$$z = \frac{9 - ir}{3 - i} \cdot \frac{(3+i)}{(3+i)}$$

conjugado

$3+i$

$$\rightarrow \frac{27 + 9i - 3ir - i^2 r}{9 + \cancel{3i} - \cancel{3i} - i^2}$$

$i^2 \rightarrow -1$

$$\rightarrow \frac{27 + 9i - 3ir - (-1)r}{9 - (-1)}$$

$$\Rightarrow \frac{27+9i-3ir+r}{10} \Rightarrow \frac{27+r}{10} + i\frac{(9-3r)}{10} \rightarrow 0$$

$$\frac{27+3}{10} = 3$$

Imaginário → $z = a+bi$

real → $z = a$ $(b=0)$

Imag. puro → $z = bi$ $(a=0)$

$$\frac{9-3r}{10} = 0 \times$$

$9-3r=0$

$9=3r$

$r=9/3$

$\boxed{r=3}$

validando...

$$\frac{9-3\cdot 3}{10} = \frac{9-9}{10} = 0$$

Revisão PSC 3

UFAM PSC 2022

No plano complexo, o conjunto dos pontos $\boxed{z = x + yi}$, tais que $\boxed{|z| \leq 1}$ e $y \leq 0$, é um(a):

$\longrightarrow Z(X, Y)$

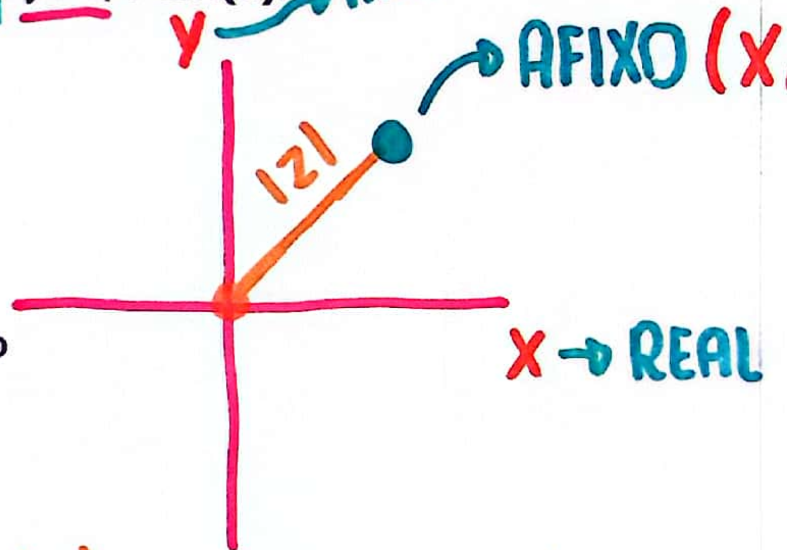
a) elipse

b) reta

c) círculo

~~d)~~ semicírculo

e) quadrado



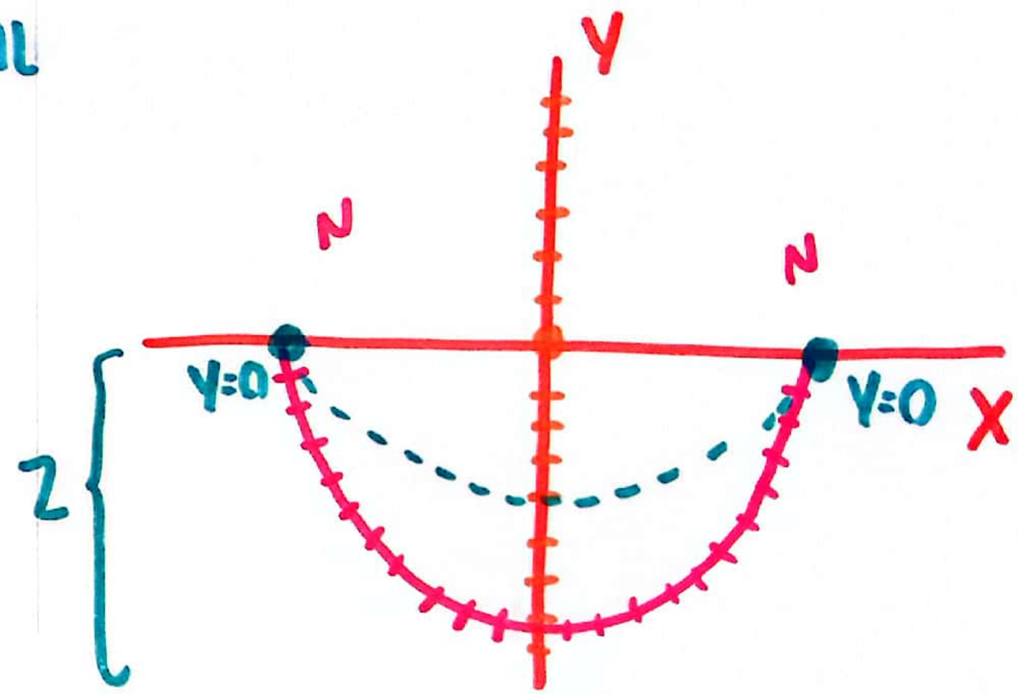
$|z| = \text{módulo}$

$|z| \leq 1$

$Z = a + bi$

$Y \leq 0$

FIG. DA QUESTÃO



Revisão PSC 3

UFAM PSC 2016

Se $z = \frac{1}{2}(1+\sqrt{3}i)$ e $w = \sqrt{2}(1-i)$ **são dois números complexos, então:**

a) $z \cdot w = \cos\left(\frac{7\pi}{6}\right) + i\ \text{sen}\left(\frac{7\pi}{6}\right)$

b) $z + w = \cos\left(\frac{7\pi}{6}\right) + i\ \text{sen}\left(\frac{7\pi}{6}\right)$

c) $z^{12} = \cos\left(\frac{4}{3}\pi\right) + i\ \text{sen}\left(\frac{4}{3}\pi\right)$

d) $\frac{z}{w} = \cos\left(\frac{7\pi}{6}\right) - i\ \text{sen}\left(\frac{7\pi}{6}\right)$

e) $z = \cos\left(\frac{\pi}{3}\right) + i\ \text{sen}\left(\frac{\pi}{3}\right)$ e

$w = 2\left(\cos\left(\frac{7\pi}{4}\right) + i\ \text{sen}\left(\frac{7\pi}{4}\right)\right)$

$\pi = 180°$

Revisão PSC 3

UFAM PSC 2015

Sabendo que

z^6

$$z = 2\left(\cos\frac{2\pi}{3} + i\,\text{sen}\,\frac{2\pi}{3}\right)$$

então z^6 é igual a:

a) z = 64 (cos 4π + i sen 4π)

b) z = 128 (cos 6π + i sen 6π)

c) z = 64 (cos π - i sen π)

d) z = 12 (cos 8π + i sen 8π)

e) z = 64 (cos π + i sen π)

$$2^6\left(\cos 6\cdot\frac{2\pi}{3} + i\cdot \text{sen}\, 6\cdot\frac{2\pi}{3}\right) \quad \frac{12}{3}$$

$$64\left(\overset{\cos}{4\pi} + i\cdot \overset{\text{sen}}{4\pi}\right)$$

$$64\left(\cos 4\pi + i\cdot \text{sen}\, 4\pi\right)$$

$$\left.\begin{matrix}\pi = 180 \\ 4\pi = x\end{matrix}\right\} \cancel{\pi}x = 180\cdot 4\cancel{\pi}$$

$$\boxed{x = 720°}$$

2 voltas

Revisão PSC 3

UFAM PSC 2017

Consideremos os seguintes números complexos:

$z = 2\,(\cos 30° + i \operatorname{sen} 30°)$ e

$w = \cos 120° + i \operatorname{sen} 120°$ $\Rightarrow |w| = 1$

Calculando z^12 · w^12, devemos obter:

a) i

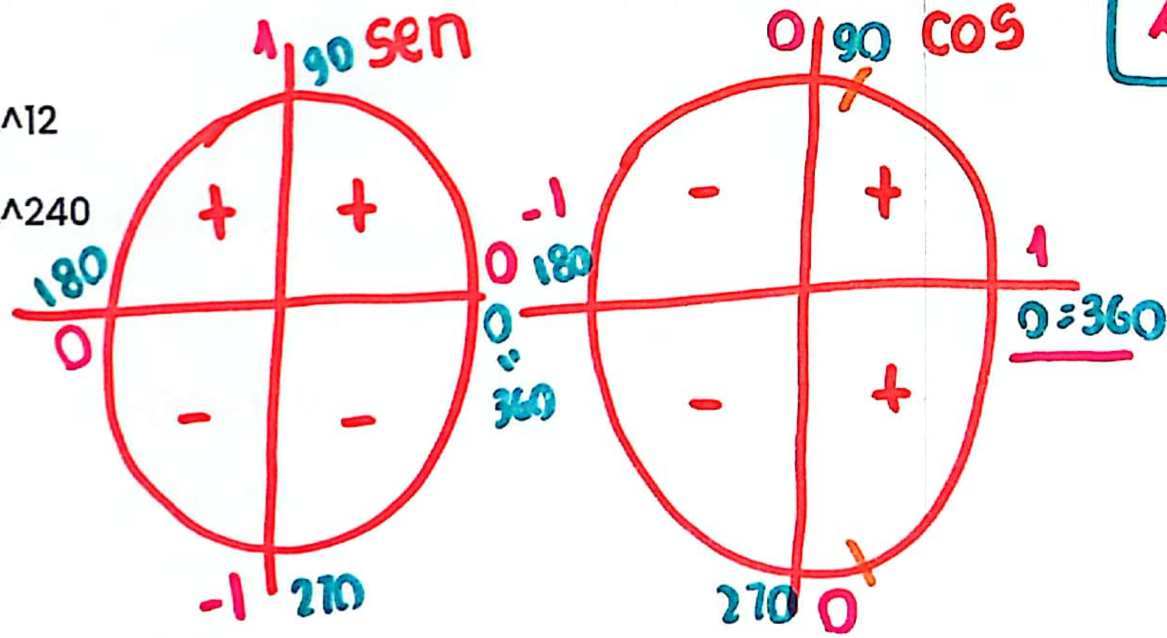
b) 0

c) 1

d) 2^12

e) 2^240

$$Z = |Z|\,(\cos\theta + i \cdot \operatorname{sen}\theta)$$



$$Z^{12} \cdot W^{12}$$

$$Z = 2^{12}(\cos \overbrace{12 \cdot 30°}^{360} + i \cdot \operatorname{sen} 12 \cdot 30)$$

$$Z = 2^{12}(\cos 360° + i \cdot \operatorname{sen} 360)$$

$$Z = 2^{12}(1 + \cancel{i\,0})$$

$$\boxed{Z = 2^{12}}$$

$$W^{12} = 1^{12}(\cos 12 \cdot 120 + i \cdot \operatorname{sen} 12 \cdot 120)$$

$$W = 1(\cos 1440 + i \cdot \operatorname{sen} 1440)$$

$$W = 1 + i \cdot 0$$

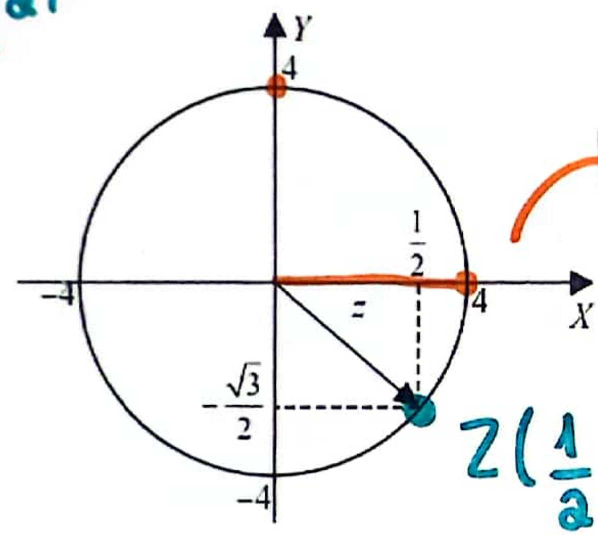
$$W = 1$$

Revisão PSC 3

UFAM PSC 2014

Se o número complexo z é definido pelo gráfico a seguir, então z^27 está localizado no:

z^{27}



$|z| = 4$

$z\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$

a) Primeiro quadrante

b) Segundo quadrante

c) Terceiro quadrante

d) Quarto quadrante

e) Eixo das abscissas

$\cos = \frac{a}{|z|} = \boxed{\frac{1}{2}}$

$\text{sen} = \frac{b}{|z|} = \boxed{\frac{-\sqrt{3}}{2}}$

$\cos > 0$

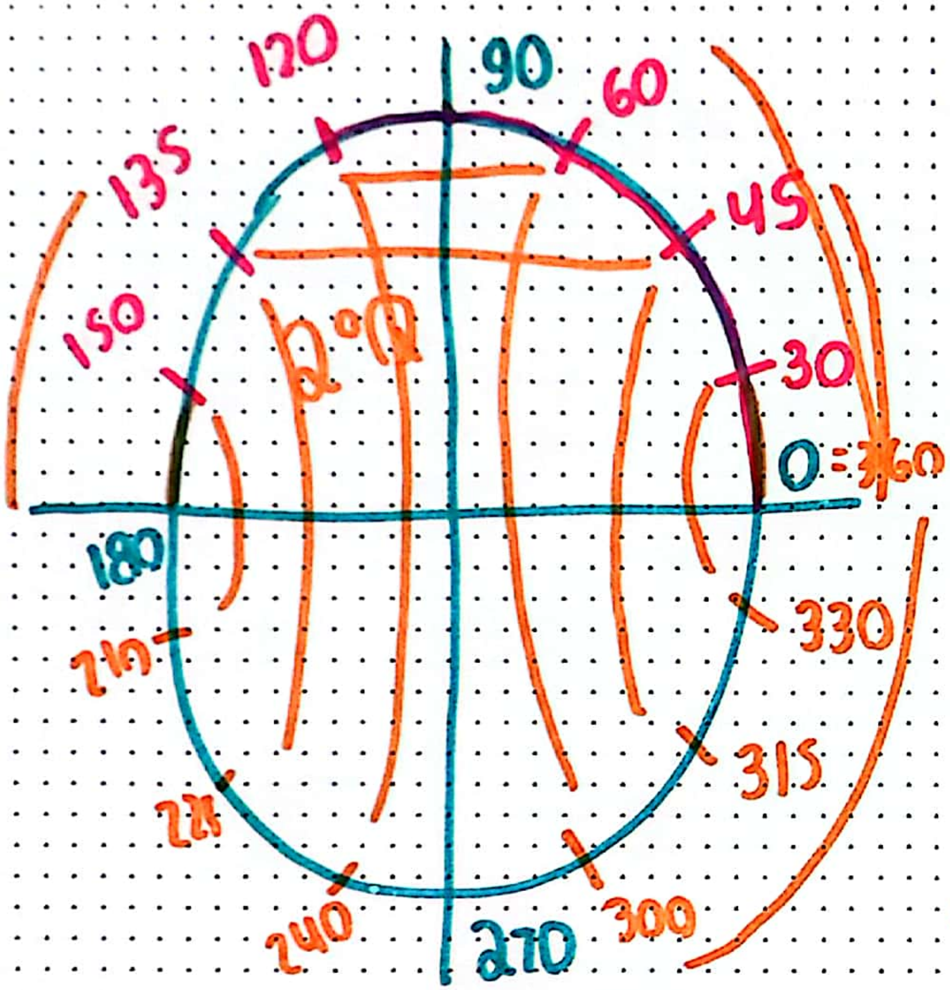
$\text{sen} < 0$

$|z|^2 = a^2 + b^2$

$|z|^2 = \left(\frac{1}{2}\right)^2 + \left(\frac{-\sqrt{3}}{2}\right)^2$

$|z|^2 = \frac{1}{4} + \frac{3}{4} = \frac{4}{4} = |z|^2 = 1$

$|z| = 1$



$\mathrm{sen}\,120 = \mathrm{sen}\,60$

$\cos 120 = -\cancel{\mathrm{sen}}\,60$

$\cos$

$1440° = 4$ voltas

$1440° = 360° = 0°$

$2^{12} \cdot 1 = \boxed{2^{12}}$

120
$\underline{\;\;12}$
240
120

$$Z = 1\left(\cos 300^{\circ\,27} + i \cdot \operatorname{sen} 300^{\circ\,27}\right)$$

$$\left(\cos 8100^\circ + i \cdot \operatorname{sen} 8100^\circ\right)$$

$\cos 60^\circ = 300^\circ$

$-\operatorname{sen} 60^\circ =$