Personal Skills 1

Complex number in polar form.

<u>Learning outcomes</u> Write a complex number in polar form, and solving complex problems in a polar form.

<u>Intended destination</u> Write a complex number (a, b) or a + bi in the complex in a polar form.

Name .... Class. ....No........................

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Write a complex number (a, b) or a + bi in the complex in a polar form.

No	$Z=a+bi$	$r=\lvert z\rvert=\sqrt{a^2+b^2}$	$\tan\theta=\dfrac{b}{a},\theta=?$	$r(\cos\theta^\circ+i\sin\theta^\circ)$
1	$Z=-1+i$	$\sqrt{(-1)^2+1^2}=\sqrt{2}$	$\tan\theta=\dfrac{1}{-1},\theta=135^0$	$\sqrt{2}\,(\cos135^\circ+i\sin135^\circ)$
2	$Z=-1+\sqrt{3}\,i$			
3	$Z=1-\sqrt{3}\,i$			
4	$Z=i$	1	$\theta=90^0$	$1\,(\cos90^\circ+i\sin90^\circ)$
5	$Z=2-2\sqrt{3}\,i$			
6	$Z=1$	1	$\theta=0^0$	$1\,(\cos0^\circ+i\sin0^\circ)$
7	$Z=8\sqrt{3}-8i$			
8	$Z=3-3i$			
9	$Z=\sqrt{7}-\sqrt{21}\,i$			
10	$Z=\dfrac{5}{2}\left(\sqrt{3}-i\right)$			

Write the complex number in polar form to the form (a, b) or a + bi.

No	$r(\cos\theta^\circ+i\sin\theta^\circ)$	$Z=a+bi$
1	$2(\cos45^\circ+i\sin45^\circ)$	$2(\dfrac{\sqrt{2}}{2}+\dfrac{\sqrt{2}}{2}i)=\sqrt{2}+\sqrt{2}i$
2	$3(\cos120^\circ+i\sin120^\circ)$	
3	$\sqrt{3}\,(\cos270^\circ+i\sin270^\circ)$	$\sqrt{3}\,(0-i)=-\sqrt{3}\,i$
4	$\sqrt{3}\,(\cos300^\circ+i\sin300^\circ)$	
5	$2(\cos150^\circ+i\sin150^\circ)$	

Summary score

Score 10 points made .... points

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<u>**แบบฝึกทักษะ**</u>

1)จงหาผลคูณของจำนวนเชิงซ้อนในรูปเชิงขั้ว ต่อไปนี้แล้วเขียนคำตอบใน a+bi

   1. $z_1=3(\cos 15^{\circ}+i\sin 15^{\circ})$ $z_2=2(\cos 75^{\circ}+i\sin 75^{\circ})$

   2. $z_1=4(\cos 40^{\circ}+i\sin 70^{\circ})$ $z_2=15(\cos 20^{\circ}+i\sin 20^{\circ})$

   3. $z_1=6(\cos 25^{\circ}+i\sin 25^{\circ})$ $z_2=3(\cos 290^{\circ}+i\sin 290^{\circ})$

   4. $z_1=2(\cos 100^{\circ}+i\sin 100^{\circ})$ $z_2=4(\cos 50^{\circ}+i\sin 50^{\circ})$

   5. $z_1=9(\cos 175^{\circ}+i\sin 175^{\circ})$ $z_2=3(\cos 275^{\circ}+i\sin 275^{\circ})$

   6.$z_1=7(\cos 130^{\circ}+i\sin 130^{\circ})$ $z_2=2(\cos 95^{\circ}+i\sin 95^{\circ})$

2)จงหาผลคูณของจำนวนเชิงซ้อนต่อไปนี้ในรูปเชิงขั้ว

   1. $z_1=i-1$, $z_2=1-i$

   2.$z_1=i$, $z_2=4+4i$

   3.$z_1=-2+2\sqrt{3}\,i$, $z_2=3-3\sqrt{3}\,i$

   4. $z_1=1-\sqrt{3}\,i$, $z_2=3\sqrt{3}+3i$

   5. $z_1=-\sqrt{3}+i$, $z_2=2\sqrt{3}+2i$

3)จงหาผลหารของจำนวนเชิงซ้อน $\dfrac{z_1}{z_2}$ ในข้อต่อไปนี้ในรูป a+bi

1.$z_1 = 9\left(\cos 313^{\circ} + i\sin 313^{\circ}\right), z_2 = 3\left(\cos 268^{\circ} + i\sin 268^{\circ}\right)$

2.$z_1 = 4\left(\cos 266^{\circ} + i\sin 266^{\circ}\right), z_2 = 2\left(\cos 86^{\circ} + i\sin 86^{\circ}\right)$

3.$z_1 = 21\left(\cos 33^{\circ} + i\sin 33^{\circ}\right), z_2 = 3\left(\cos 93^{\circ} + i\sin 93^{\circ}\right)$

4) จงหาผลหารของจำนวนเชิงซ้อน $\dfrac{z_1}{z_2}$ ในรูปเชิงขั้วแล้วเขียนตอบในรูป a+bi

1.$z_1 = 1 - i, z_2 = -1 - i$

2.$z_1 = 1 - \sqrt{3}i, z_2 = -1 - \sqrt{3}i$

3. $z_1 = -2 + 2\sqrt{3}i, z_2 = -\sqrt{2} - \sqrt{2}i$

4.$z_1 = -8\sqrt{3} + 8i, z_2 = -3 + 3i$

5.$z_1 = -\sqrt{7} + \sqrt{21}i, z_2 = 2 + 2\sqrt{3}i$