

Spiral Review:

Find the point on the terminal side, determine the exact values of sine, cosine, and tangent.

(12, 16)

$$r = \sqrt{x^2 + y^2}$$

$$r = 20$$

$$\sin \theta = \frac{16}{20} = \frac{4}{5}$$

$$\cos \theta = \frac{12}{20} = \frac{3}{5}$$

$$\tan \theta = \frac{16}{12} = \frac{4}{3}$$

6.3 Vectors and 6.5 Complex Numbers w/Trig

Example 1: Find the component form of v , where $u = 2i - j$, $w = i + 2j$.
 \uparrow $v = \langle i, j \rangle$

$$\begin{aligned} \text{a.) } v &= \frac{3}{4}w \\ &= \frac{3}{4}(i + 2j) \\ &= \frac{3}{4}i + \frac{3}{2}j \\ v &= \left\langle \frac{3}{4}, \frac{3}{2} \right\rangle \end{aligned}$$

$$\begin{aligned} \text{c.) } v &= 2(u - w) \\ &= 2(2i - j - (i + 2j)) \\ &= 2(2i - j - i - 2j) \\ &= 2(i - 3j) \\ &= 2i - 6j \\ v &= \langle 2, -6 \rangle \end{aligned}$$

$$\begin{aligned} \text{b.) } v &= -u + w \\ &= -(2i - j) + i + 2j \\ &= -2i + j + i + 2j \\ &= -i + 3j \\ v &= \langle -1, 3 \rangle \end{aligned}$$

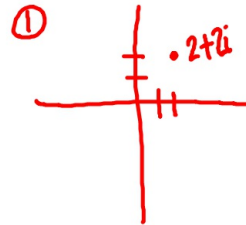
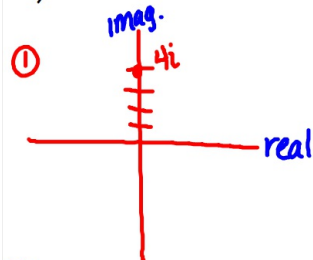
Students can graph the complex number and find the trigonometric form of the number.

Example 2: Represent the complex number graphically, and find the trigonometric form of the number.

$$r = \sqrt{a^2 + b^2}, \quad z = r(\cos\theta + i\sin\theta), \quad z = a + bi$$

a.) $4i = z$

b.) $2 + 2i$



② $r = \sqrt{0^2 + 4^2}$
 $r = 4$

② $r = \sqrt{2^2 + 2^2}$
 $r = 2\sqrt{2}$

③ $\tan\theta = \frac{b}{a} = \frac{4}{0}$
 $\theta = \frac{\pi}{2}$

③ $\tan\theta = \frac{2}{2} = 1$
 $\theta = \frac{\pi}{4}$

④ $z = 4(\cos \frac{\pi}{2} + i\sin \frac{\pi}{2})$

④ $z = 2\sqrt{2}(\cos \frac{\pi}{4} + i\sin \frac{\pi}{4})$

Students can graph the complex number and find the trigonometric form of the number.

c.) $1 - \sqrt{3}i$

d.) $-\frac{5}{2}(\sqrt{3} + i)$
 $(-\frac{5\sqrt{3}}{2} - \frac{5}{2}i)$

② $r = \sqrt{1^2 + (-\sqrt{3})^2}$
 $= \sqrt{4}$
 $r = 2$

② $r = \sqrt{(-\frac{5\sqrt{3}}{2})^2 + (-\frac{5}{2})^2}$
 $= \sqrt{\frac{75}{4} + \frac{25}{4}} = \sqrt{\frac{100}{4}}$
 $= \frac{10}{2} = 5$

③ $\tan\theta = \frac{-\sqrt{3}}{1}$
 $\theta = \frac{5\pi}{3}$

③ $\tan\theta = \frac{-\frac{5}{2}}{-\frac{5\sqrt{3}}{2}} = \frac{\sqrt{3}}{3}$

④ $z = 2(\cos \frac{5\pi}{3} + i\sin \frac{5\pi}{3})$

④ $z = 5(\cos \frac{\pi}{6} + i\sin \frac{\pi}{6})$

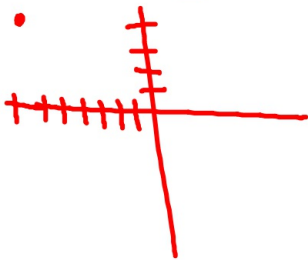
Students will be able to represent the complex number graphically and find the standard form of the number.

Example 3: Represent the complex number graphically, and find the standard form of the number.

a.) $8\left(\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right)$

$8\left(-\frac{\sqrt{3}}{2} + i\frac{1}{2}\right)$

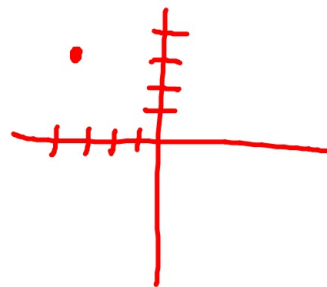
$-4\sqrt{3} + 4i$



b.) $5\left(\cos 135^\circ + i\sin 135^\circ\right)$

$5\left(-\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}\right)$

$-\frac{5\sqrt{2}}{2} + \frac{5\sqrt{2}}{2}i$



Turn-in:

p.452 (32, 36)

HW:

p. 430 (67,69,71)

p.452 (23-46 every 3rd, 47,49,51)