

1. Determine the center and radius of the circle with equation  $x^2 + y^2 - 2x + 2y - 14 = 0$

$$x^2 - 2x + (-1)^2 + y^2 + 2y + 1^2 = 14 + 1 + 1$$

$$(x-1)^2 + (y+1)^2 = 16$$

center = (1, -1)  
radius = 4

2. Determine the major vertices of ellipse whose equation is  $5x^2 + 3y^2 = 15$

$$\frac{5x^2}{15} + \frac{3y^2}{15} = \frac{15}{15}$$

put in standard form

$$\frac{x^2}{3} + \frac{y^2}{5} = 1$$

major axis

(0,  $\sqrt{5}$ ) (0,  $-\sqrt{5}$ )

3. Find the product and write in standard form.

$$\left[\frac{18}{5}(\cos 55^\circ + i \sin 55^\circ)\right] \cdot \left[\frac{20}{3}(\cos 95^\circ + i \sin 95^\circ)\right]$$

$$\frac{18 \cdot 20}{5 \cdot 3} (\cos 55^\circ + 95^\circ + i \sin 55^\circ + 95^\circ)$$

$$24 (\cos 150^\circ + i \sin 150^\circ)$$

$$24 \left(-\frac{\sqrt{3}}{2} + i \frac{1}{2}\right)$$

$$= -12\sqrt{3} + 12i$$

4. Write the complex number in standard form.

$$8 \left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4}\right)$$

$$8 (\cos 315^\circ + i \sin 315^\circ)$$

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

$$4\sqrt{2} + -4\sqrt{2}i \quad 4\sqrt{2} - 4\sqrt{2}i$$

5. Eliminate the parameter.

$$\begin{cases} x = \sqrt{t+3} \\ y = t^2 - 6 \end{cases}$$

$$x = \sqrt{t+3} \Rightarrow x^2 = t+3 \Rightarrow t = x^2 - 3$$

$$y = (x^2 - 3)^2 - 6 = (x^2 - 3)(x^2 - 3) - 6 = y = x^4 - 6x^2 + 3$$

6. Find a set of parametric equations.

$$\begin{aligned} x &= t + 5 \\ y &= (x - 5)^2 \end{aligned}$$

$$y = t^2 \quad \begin{cases} y = t^2 \\ x = t + 5 \end{cases}$$

7. Find the component form and the magnitude of the vector v.

Initial point: (-1, 5)  
Terminal point: (15, 2)

Component form

$$(15 - (-1), 2 - 5) = \langle 16, -3 \rangle$$

$$\sqrt{16^2 + (-3)^2} = \sqrt{265}$$

magnitude is  $\sqrt{265}$

8. Find the direction angle of the vector.

$u = 2i - j$

$$\tan \theta = \frac{-1}{2}$$

$$\tan^{-1}\left(\frac{-1}{2}\right) = -27^\circ$$

$$360 - 27 = 333^\circ \quad (= 333^\circ)$$

9. Find the component form of v where  $u = 4i - 2j$  and  $w = i - j$ .  
 $v = 2u - w$

$$2(4i - 2j) - (i - j)$$

$$\langle 8i - 4j \rangle - \langle i - j \rangle$$

$$\langle 7i - 3j \rangle = \langle 7, -3 \rangle$$

10. Find the distance between two points.

(1, 1, -7), (-2, -3, -7)

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

$$\sqrt{(1 - (-2))^2 + (1 - (-3))^2 + (-7 - (-7))^2}$$

$$\sqrt{3^2 + 4^2 + 0^2}$$

$$\sqrt{9 + 16} = \sqrt{25} = 5$$