

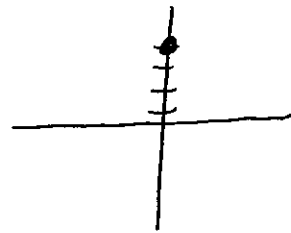
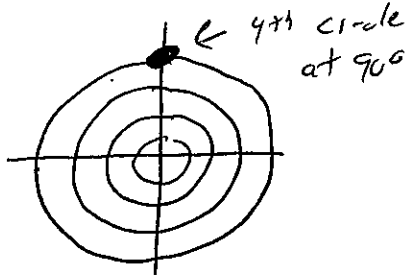
Math 12 Homework - Polar Coordinates

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1, 3, 5-8, 15, 17, 19, 21, 24

$$1) (4, \frac{3\pi}{6}) = \boxed{4(\cos \frac{\pi}{2}, \sin \frac{\pi}{2})} = \boxed{(0, 4)} \quad \text{Answer}$$

Graphs - Polar



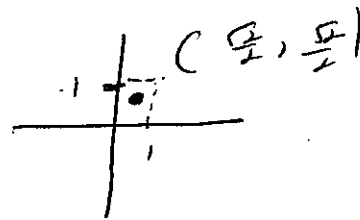
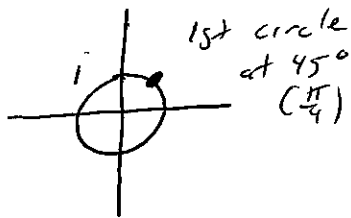
Rectangular
(0, 4)

$$3) (-1, \frac{5\pi}{4}) \longrightarrow (-1) (\frac{5\pi}{4} - \pi) = (1, \frac{\pi}{4})$$

$$(r, \theta) = (-r, \theta \pm \pi) = \text{equivalent polar}$$

$$(-1, \frac{5\pi}{4}) = (1, \frac{\pi}{4}) = 1(\cos \frac{\pi}{4}, \sin \frac{\pi}{4}) = \boxed{(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})} \quad \text{Answer}$$

Graph - Polar



Rectangular
Graph

$$\# 5) (4, -\frac{\pi}{3}) =$$

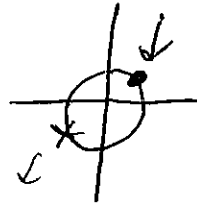
$$\frac{\pi}{3} = 60^\circ$$

$$4(\cos(-\frac{\pi}{3}), \sin(-\frac{\pi}{3}))$$

$$4(\frac{1}{2}), 4(-\frac{\sqrt{3}}{2}) = (2, -2\sqrt{3}) \text{ in rectangular}$$

$$\#6) \quad (-1, -\frac{2\pi}{4}) = (-(-1), -\frac{3\pi}{4} + \pi) = (1, \frac{\pi}{4})$$

$$(r, \theta) = (-r, \theta \pm \pi)$$



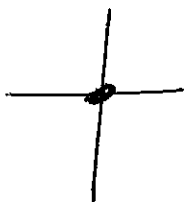
$$(1, \frac{\pi}{4}) = 1 (\cos \frac{\pi}{4}, \sin \frac{\pi}{4})$$

$$= \boxed{(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})}$$

$(-1, -\frac{3\pi}{4})$ then reflect
through origin

$$\#7) \quad (0, -\frac{7\pi}{6})$$

$$r, \theta$$



$$= 0 (\frac{-\sqrt{3}}{2}, \frac{1}{2})$$

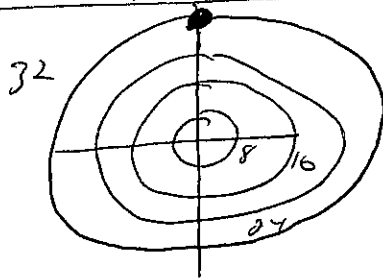
$$= \boxed{(0,0)}$$

$$0 (\cos(-\frac{7\pi}{6}), \sin(-\frac{7\pi}{6}))$$

$$8) \quad (32, \frac{5\pi}{4})$$

$$\downarrow$$

$$= 2.5\pi$$



$$= 32 (\cos \frac{5\pi}{4}, \sin \frac{5\pi}{4}) = 32 (0, 1) = \boxed{(0, 32)}$$

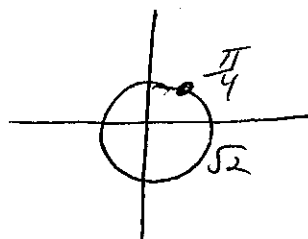
$$\#55) \quad (1, 1) = \begin{array}{c} 1 \\ | \\ \cdot \\ | \\ 1 \end{array}$$

polar $r = \sqrt{1^2 + 1^2} = \sqrt{2}$

$\theta = \tan^{-1}(\frac{1}{1}) = 45^\circ$
 $\theta = 45^\circ$

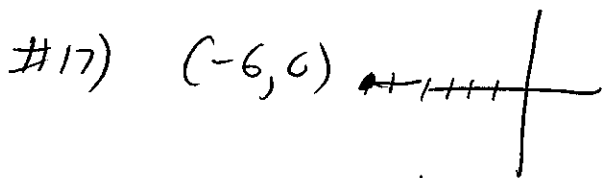
polar = $(\sqrt{2}, 45)$ or $(\sqrt{2}, \frac{\pi}{4})$

$$\boxed{(\sqrt{2}, \frac{\pi}{4})} = \boxed{(-\sqrt{2}, \frac{5\pi}{4})}$$



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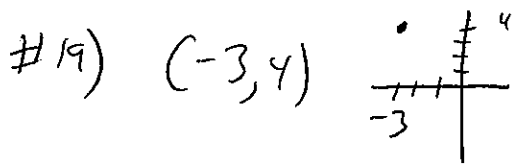
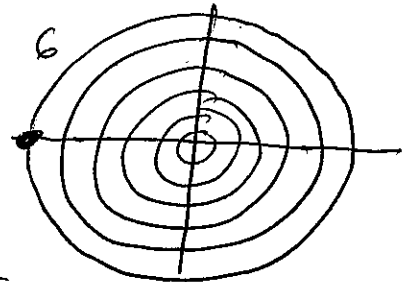


$$r = \sqrt{(-6)^2 + 0^2} = \sqrt{36} = 6 = r$$

$$\theta = 180^\circ = \pi = \theta$$

$$(-6, 0) = \boxed{(6, \pi) = (-6, 0)}$$

equivalent polar



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

$$\tan^{-1}\left(\frac{4}{-3}\right) = 53^\circ$$

$$\theta = 127^\circ$$

$$\text{polar} = \boxed{(5, 127^\circ) = (-5, 307^\circ)} \leftarrow -r \text{ and } \theta \pm \pi$$



#21) $(-\sqrt{3}, -\sqrt{3})$

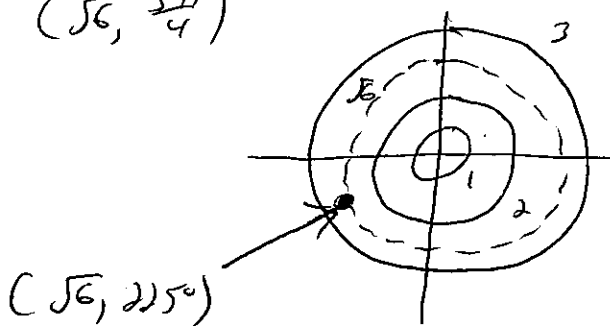
$$r = \sqrt{(-\sqrt{3})^2 + (-\sqrt{3})^2} = \sqrt{3+3} = \sqrt{6}$$

$$\tan^{-1}\left(\frac{-\sqrt{3}}{-\sqrt{3}}\right) = 45^\circ = \theta_r \quad \theta = 225^\circ$$

$$r = \sqrt{6}, \theta = 225^\circ$$

$$\text{polar} = \boxed{(\sqrt{6}, 225^\circ) = (-\sqrt{6}, 45^\circ)} \leftarrow -r, \theta \pm \pi$$

$(\sqrt{6}, \frac{5\pi}{4})$



#24) (5, 12)

$$r = \sqrt{5^2 + 12^2} = \sqrt{169} = 13$$



$$\tan^{-1}\left(\frac{12}{5}\right) = 67^\circ = \theta$$

$r = 13$
 $\theta = 67^\circ$

$$\text{polar} = \boxed{(13, 67^\circ) = (-13, 247^\circ)}$$

