

Charlton does Polar

I A On your first polar graph locate each point. Rewrite each coordinate into its cartesian form.

- 1) $(1, \frac{\pi}{6})$ 2) $(2, \frac{\pi}{3})$ 3) $(2, -\frac{\pi}{3})$ 4) $(-2, -\frac{\pi}{3})$ 5) $(-2, \frac{\pi}{3})$
 6) $(3, \frac{\pi}{4})$ 7) $(5, \frac{5\pi}{6})$ 8) $(-5, \frac{11\pi}{6})$ 9) $(4, \frac{3\pi}{4})$ 10) $(3, \frac{4\pi}{3})$

B On your second polar graph locate each point. Rewrite each coordinate into its cartesian form.

- 1) $(4, 120^\circ)$ 2) $(5, 75^\circ)$ 3) $(-3, 270^\circ)$ 4) $(2, 150^\circ)$ 5) $(3, 315^\circ)$
 6) $(-4, 135^\circ)$ 7) $(3, 60^\circ)$ 8) $(4, 45^\circ)$ 9) $(5, 300^\circ)$ 10) $(4, 180^\circ)$

C Rewrite each coordinate into its polar form. Plot on your third polar graph

- 1) $(3, 4)$ 2) $(-3, 4)$ 3) $(3, -4)$ 4) $(4, 3)$ 5) $(-4, -3)$
 6) $(\frac{3}{2}, -\frac{3\sqrt{3}}{2})$ 7) $(-2, 2\sqrt{3})$ 8) $(0, -2)$ 9) $(\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2})$ 10) $(\frac{1}{2}, \frac{-\sqrt{3}}{2})$

D Rewrite each coordinate into its polar form. Plot on your fourth polar graph.

- 1) $(\frac{-3}{2}, \frac{-3\sqrt{3}}{2})$ 2) $(2\sqrt{2}, -2\sqrt{2})$ 3) $(3, 5)$ 4) $(-2, 4)$ 5) $(-4, -3)$
 6) $(\frac{1}{2}, 4)$ 7) $(5, -2)$ 8) $(0, -2)$ 9) $(2, 3)$ 10) $(\frac{1}{2}, \frac{1}{2})$

II For each make a table. Sketch the graph. Convert equation to cartesian form. (2 equations per polar graph.)

- a) $r = 3 \sin \theta$ b) $r = 2 \csc \theta$ c) $r = \frac{3}{4 \cos \theta + 5 \sin \theta}$
 d) $r = 4 \cos \theta + 6 \sin \theta$ e) $r = 2 \sin 2\theta$ f) $r = 1 + \sin \theta$

III Transform each of the following into polar form ($r = \dots$). Sketch on polar graph (2 per axis)

- a) $y = x^2$ b) $x + 2y = 3$ c) $x^2 + y^2 = 3$ d) $xy = 2$
 e) $x^2 + y^2 = 4x$ f) $x = -2$ g) $y = 3$ h) $y = 2x + 1$

IV a) State at least three pairs of polar coordinates (r, θ) for $(3, \frac{3\pi}{4})$ where

- 1) $r > 0$ 2) $r < 0$

b) Sketch the curves $r = 1 + \cos \theta$ and $r = 1 - \sin \theta$ on the same axis. What are the *cartesian* coordinates where the two curves intersect? Explain your methods. Explain why there are not three points.

V Make a table of values from zero to 2π for each. Plot the points and sketch on a polar axis:

- a) $r = 1 + 2 \cos \theta$ b) $r = 1 + \frac{1}{2} \cos \theta$ c) $r = 1 - \cos \theta$ d) $r = 1 - 2 \cos \theta$