8.1: 26, 38, 56, 61a
8.2: 18, 48

HOMEWORK 6

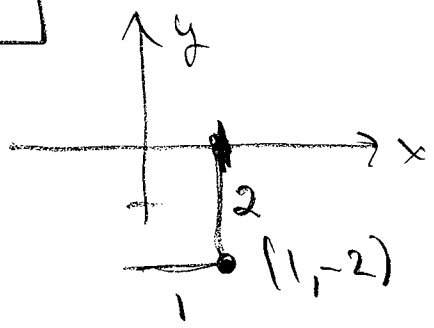
8.1:26: $(r,\theta) = (6, 2\pi/3)$,

$x = r\cos\theta = 6\cos\frac{2\pi}{3} = -3$

$y = r\sin\theta = 6\sin\frac{2\pi}{3} = +3\sqrt{3}$

$\therefore (x,y) = (-3, 3\sqrt{3})$. //

8.1:38: $(x,y) = (1,-2)$,



$r = \sqrt{x^2+y^2} = \sqrt{1+4} = \sqrt{5}$.

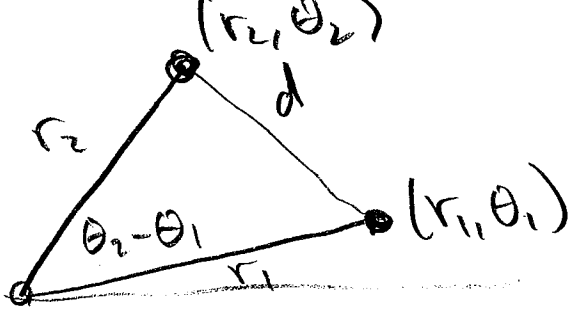
$\theta = \tan^{-1}(y/x) = \tan^{-1}(-2/1)$.

$\therefore (r,\theta) = (\sqrt{5}, \tan^{-1}(-2))$. //

8.1:56 $r = \dfrac{4}{1+\sin\theta}$ } convert to cartesian

$\Rightarrow r + r\sin\theta = 4 \Rightarrow \sqrt{x^2+y^2} + y = 4$.

6.1a GET POLAR DISTANCE FORMULA

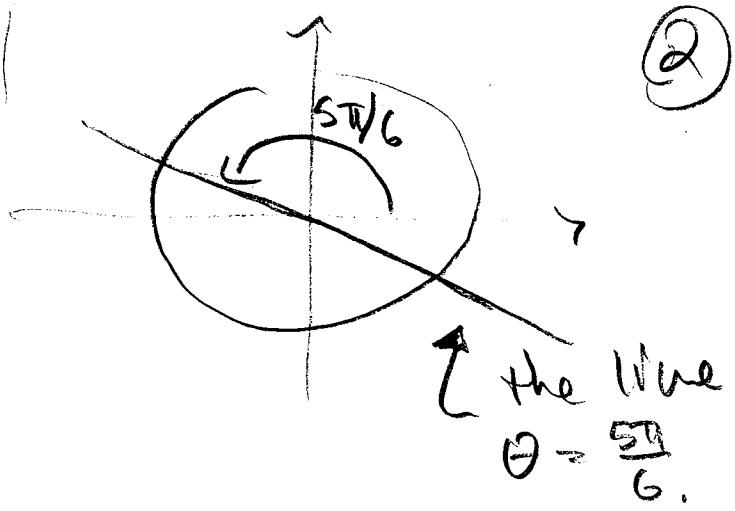


by law of cosines

$d^2 = r_1^2 + r_2^2 - 2r_1r_2\cos(\theta_2-\theta_1)$

$\Rightarrow d = \sqrt{r_1^2+r_2^2-2r_1r_2\cos(\theta_2-\theta_1)}$

8.2:18 graph $\theta = 5\pi/6$



8.2:48 graph $(x^2+y^2)^3 = (x^2-y^2)^2$.

use $x = r\cos\theta$ & $y = r\sin\theta$.

$$\Rightarrow (r^2)^3 = \left(r^2(\cos\theta)^2 - r^2(\sin\theta)^2\right)^2$$

$$\Rightarrow r^6 = r^4\left((\cos\theta)^2 - (\sin\theta)^2\right)^2$$

$$\Rightarrow r^2 = \left(\cos(2\theta)\right)^2$$

$$\Rightarrow r = \cos(2\theta).$$