HW2

1

1. 21/2/2
2. 1
3. 31/2/2
4. 0
5. 1
6. ½
7. -21/2/2
8. 31/2/2
9. -31/2
10. 31/2

2.a

1. (r = 5 , theta = arctan(4/3))
2. (r = 2, theta = pi/6)
3. (r = 23/2 , theta = 3\*pi/4)
4. (r = ,1 theta = pi/2)
5. (r = 13, theta =arctan(4) )

b

1. (x = 1 , y = 0)
2. (x = 3\*2-1/2 , y = 3\*2-1/2)
3. (x = 3\*2-1/2 , y = 3\*2-1/2)
4. (x = 5/2, y = -5\*31/2/2)
5. (x = 31/2, y = -1/2)

3.a

i) x4

ii) e-2

b

1. (x+5)2-25
2. (x+2)2-1
3. (x+4)2
4. (x+8)(x-8)
5. (x-3/2)2-121/4
6. e2x, x is not 1/e

4.

a)

i) 45

ii) 139

iii) 91

b)

i) 85/6

ii) 184

5.

a) I think the polar coordinates are more suitable for describing orbit equation related problem. Because the physical meaning under the equation is more direct through polar coordinate, describing it on 2 dimension plane. For example , given x = r\*cos(theta), y = r\*sin(theta), position at theta(from +x position) has the x coordinate as reciprocal of r+e depending on r is clear to me.

b) x = [(1+y2/x2)1/2+e]-1

multiply 2e to both sides, left side = 2\*e\*x

right side = 2\*e /((1+y2/x2)1/2+e)

= 2ex/(r+ex) = (ex+r+ex-r)/ (r+ex) = 1-(r-ex)/ (r+ex)

Because through origin 2.1, x\*((1+y2/x2)1/2+e) = 1, we have x\*(r/x+e) = 1 and thus r+ex = 1 (\*)

Substitute (\*) in right side left , 1-(r-ex)/ (r+ex) = r+ex-(r-ex) = 2\*e\*x = left side

To get the polar coordinates notated equation, substitute x with the polar coordinates,

into (\*), r + e\*(r\*cos(theta)) = 1

r\*(1+ e\*cos(theta)) = 1

Thus r = 1/(1+e\*cos(theta))