Practice Problem

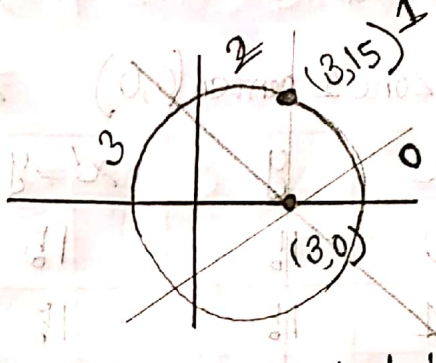
(1) (a) Center = (3,0)

Starting point = (3,15)

$$\text{radius} = \sqrt{(3-3)^2 + (15-0)^2}$$

$$= \sqrt{(15)^2}$$

$$r = 15$$



[3,15 pixel point is between zone 1 and zone 2]

h k

	Center (0,0); radius = 15				Center (3,0)	
x	y	d	E/SE	d update	x+h	y+k
0	15	-14	E	-11	3	15
1	15	-11	E	-6	4	15
2	15	-6	E	1	5	15
3	15	1	SE	-18	6	15
4	14	-18	E	-7	7	14
5	14	-7	E	6	8	14
6	14	6	SE	-5	9	14
7	13	-5	E	12	10	13
8	13	12	SE	7	11	13
9	12	7	SE	6	12	12
10	11	6	SE	69	13	11
11	10	—	—	—	14	10

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(b) 12 Pixels for Zone 0, 3, 5, 7

h k

Zone 1, center (0,0) Zone 0, center (0,0) Zone 0, center (3,0)

x	y	x'=y	y'=x	x'+3	y'+0
0	15	15	0	18	0
1	15	15	1	18	1
2	15	15	2	18	2
3	15	15	3	18	3
4	14	14	4	17	4
5	14	14	5	17	5
6	14	14	6	17	6
7	13	13	7	16	7
8	13	13	8	16	8
9	12	12	9	15	9
10	11	11	10	14	10

For Zone 3:

Zone 3, center 0,0) Zone 3, center (3,0)

x	y	x'=-y	y=x	x'+3	y'+0
0	15	-15	0	-12	0
1	15	-15	1	-12	1
2	15	-15	2	-12	2
3	15	-15	3	-12	3
4	14	-14	4	-11	4
5	14	-14	5	-11	5
6	14	-14	6	-11	6
7	13	-13	7	-10	7
8	13	-13	8	-10	8
9	12	-12	9	-9	9
10	11	-11	10	-8	10

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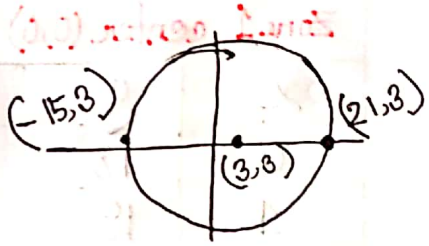
$x_1\ y_1 \quad x_2\ y_2$

2(a) diameter from (21,3) to (−15,3)

$$\therefore \text{Center} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

$$= \left(\frac{21-15}{2}, \frac{3+3}{2}\right)$$



center = (3,3)

$$\text{radius} = \sqrt{(21-3)^2 + (3-0)^2}$$

$$= \sqrt{(18)^2}$$

radius = 18

	Center (0,0), radius = 18				h k Center (3,3)	
x	y	d	E/SE	d update	x+h	y+k
0	18	−17	E	−14	3	21
1	18	−14	E	−9	4	21
2	18	−9	E	−2	5	21
3	18	−2	E	7	6	21
4	18	7	SE	−16	7	21
5	17	−16	E	−3	8	20
6	17	−3	E	12	9	20
7	17	12	SE	−3	10	20
8	16	−3	E	16	11	19
9	16	16	SE	7	12	19
10	15	7	SE	2	13	18
11	14	2	SE	1	14	17

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⑥ For zone 4

Zone 1, center (0,0)		Zone 4, center (0,0)		Zone 4, center (3,3)	
x	y	$x' = -y$	$y' = -x$	$x'+3$	$y'+3$
0	18	-18	0	-15	3
1	18	-18	-1	-15	2
2	18	-18	-2	-15	1
3	18	-18	-3	-15	0
4	18	-18	-4	-15	-1
5	17	-17	-5	-14	-2
6	17	-17	-6	-14	-3
7	17	-17	-7	-14	-4
8	16	-16	-8	-13	-5
9	16	-16	-9	-13	-6
10	15	-15	-10	-12	-7
11	14	-14	-11	-11	-8

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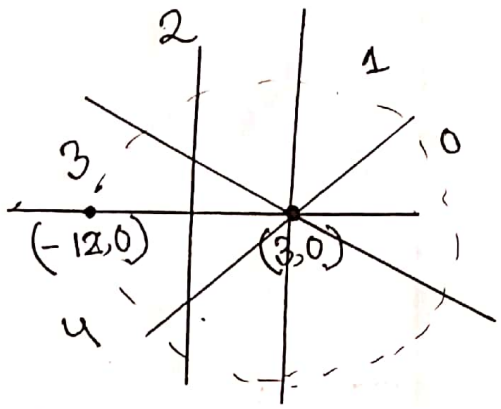
③ Center (3,0)

Starting point (-12,0)

(-12,0) pixel is between Zone 3 and Zone 4



$$\text{radius} = \sqrt{(3-(-12))^2 + (0-0)^2}$$

$$= \sqrt{(15)^2}$$

$$r = 15$$

	Center (0,0), radius = 15 (Zone 1)				center (0,0), Zone 4		center (3,0), Zone 4	
x	y	d	E/SE	d update	$x' = -y$	$y' = -x$	$x' + 3$	$y' + 0$
0	15	-14	E	-11	-15	0	-12	0
1	15	-11	E	-6	-15	-1	-12	-1
2	15	-6	E	1	-15	-2	-12	-2
3	15	1	SE	-18	-15	-3	-12	-3
4	14	-18	E	-7	-14	-4	-11	-4
5	14	-7	E	6	-14	-5	-11	-5
6	14	6	SE	-5	-14	-6	-11	-6
7	13	-5	E	12	-13	-7	-10	-7
8	13	12	SE	7	-13	-8	-10	-8
9	12	7	SE	6	-12	-9	-9	-9
10	11	6	SE	9	-11	-10	-8	-10
11	10	—	—	—				

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