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1. Plot the points using midpoint ellipse with $x_c = 3$ and $y_c = 5$ for region 1.

→ MIDPOINT ELLIPSE FOR REGION I ONLY.

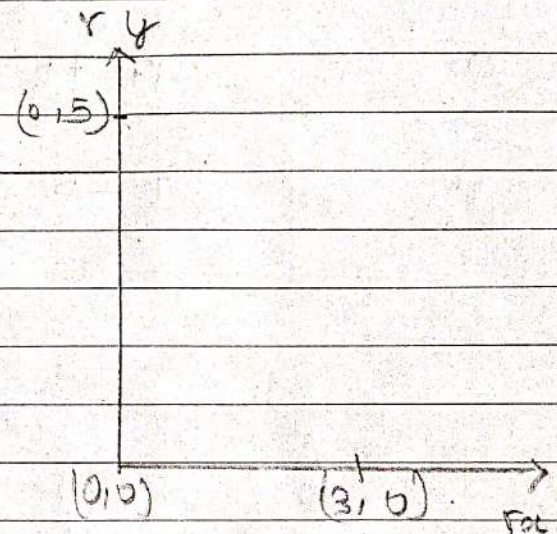
$$x_c = 3 \quad y_c = 5$$

$$P_{0K} = x_c^2 + \frac{y_c^2}{4} - x_c \cdot y_c$$

$$P_{0K} = (3)^2 + \frac{(5)^2}{4} - 5(3)$$

$$P_{0K} = -17.75$$

$$\therefore P_{0K} < 0$$



* $PLOT(x_{k+1}, y_k) = (1, 5)$

$$\text{Now, } 2x_{k+1}y_k = 2 \times 1 \times 5 = 10$$

$$2x_k^2y_{k+1} = 2 \times 3^2 \times 5 = 90$$

$$\therefore 2x_{k+1}y_k < 2x_k^2y_{k+1} \text{ So proceed.}$$

$$\therefore P_{0K} < 0$$

$$P_{1K} = P_{0K} + 2x_{k+1}y_k + x_{k+1}^2$$

$$P_{1K} = -17.75 + 2(1)(5) + (1)^2$$

$$P_{1K} = 54.25$$

$$\therefore P_{1K} > 0$$

* Plot $(x_{k+1}, y_{k+1}) = (2, 4)$.

Now

$$2xy^2_{k+1} = 2 \times (5)^2 \times 2 = 100.$$

$$2x^2y_{k+1} = 2 \times (3)^2 \times 4 = 72.$$

$\therefore 2xy^2_{k+1} > 2x^2y_{k+1}$ so stop since region I has been completed.

K	P_k	(x_{k+1}, y_{k+1})	$2xy^2_{k+1}$	$2x^2y_{k+1}$
0	-17.75	(1, 5).	50	90.
1	57.25	(2, 4).	100	72.

