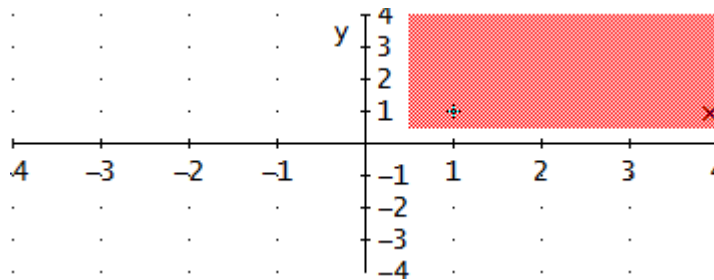


#1: $\left(x - \frac{1}{2}\right)^{1/2} \cdot \left(y - \frac{1}{2}\right)^{1/2}$

a) $Q(kx, ky) = (kx - 1/2)^{1/2} \cdot (ky - 1/2)^{1/2}$ We can not write $Q(kx, ky)$ as $k^\alpha \cdot Q(x, y)$. Q is not homogeneous.

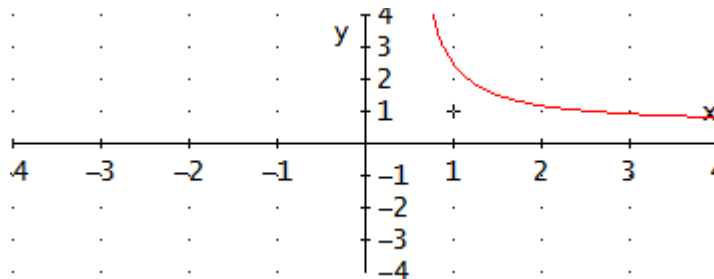
b) Domain

#2: $x \geq \frac{1}{2} \wedge y \geq \frac{1}{2}$



c) Contour line of level 1.

#3: $\left(x - \frac{1}{2}\right)^{1/2} \cdot \left(y - \frac{1}{2}\right)^{1/2} = 1$



To calculate one point I give values to x . For example $x=1$. I replace in the equation #3.

#4:
$$\frac{\sqrt{(2 \cdot y - 1)}}{2} = 1$$

#5:
$$\text{SOLVE} \left(\frac{\sqrt{(2 \cdot y - 1)}}{2} = 1, y \right)$$

#6:
$$y = \frac{5}{2}$$

The point $x=1, y=5/2$ is on the isoquant of level 1.

d) Marginal productivities.

$$\#7: \frac{d}{dx} \left(\left(x - \frac{1}{2} \right)^{1/2} \cdot \left(y - \frac{1}{2} \right)^{1/2} \right)$$

$$\#8: \frac{\sqrt{(2 \cdot y - 1)}}{2 \cdot \sqrt{(2 \cdot x - 1)}}$$

$$\#9: \frac{d}{dy} \left(\left(x - \frac{1}{2} \right)^{1/2} \cdot \left(y - \frac{1}{2} \right)^{1/2} \right)$$

$$\#10: \frac{\sqrt{(2 \cdot x - 1)}}{2 \cdot \sqrt{(2 \cdot y - 1)}}$$

e) Marginal productivities at the point (3/2, 3/2):

$$\#11: \frac{\sqrt{\left(2 \cdot \frac{3}{2} - 1 \right)}}{2 \cdot \sqrt{\left(2 \cdot \frac{3}{2} - 1 \right)}}$$

$$\#12: \frac{1}{2}$$

$$\#13: \frac{1}{2}$$

The marginal productivities are equal. We can increase any of the inputs.

g) $\text{Var}(x) = -1/8$, $\text{Var}(y) = 1/10$. We use the differential: $DQ = Q'_x \cdot \text{var}(x) + Q'_y \cdot \text{Var}(y)$

$$\#14: \frac{1}{2} \cdot \left(-\frac{1}{8} \right) + \frac{1}{2} \cdot \frac{1}{10}$$

$$\#15: -\frac{1}{80}$$

The production would decrease 1/80 units approximately.

f) Elasticity $E = Q'_y \cdot y / Q$

$$\#16: \frac{\frac{\sqrt{(2 \cdot x - 1)}}{2 \cdot \sqrt{(2 \cdot y - 1)}} \cdot y}{\left(x - \frac{1}{2}\right)^{1/2} \cdot \left(y - \frac{1}{2}\right)^{1/2}}$$

$$\#17: \frac{y}{2 \cdot y - 1}$$

$$\#18: \frac{\frac{3}{2}}{2 \cdot \frac{3}{2} - 1}$$

$$\#19: \frac{3}{4}$$

The production would increase 0.75%.

h) Marginal rate of substitution: $\partial y / \partial x = -Q'_x / Q'_y$

$$\#20: - \frac{\frac{1}{2}}{\frac{1}{2}}$$

$$\#21: -1$$

If we increase x 1 units we should decrease y 1 units to keep the same production. So, if we want to decrease x in 1/2 units, we should increase y in 1/2 units.