#1: $$\left(x - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2}$$

A) Marginal productivities:

#2: $$\frac{d}{dx}\left(\left(x - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2}\right)$$

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

#4: $$\frac{d}{dy}\left(\left(x - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2}\right)$$

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

b) Marginal productivities at the point (3/4, 3/4):

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

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

The marginal productivities are equal. We can increase any of them.

c) Differential: DQ=Q'x*Var(x)+Q'y*Var(y)

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

The result of that is -9/80. So, the production would decrease approximately 9/80 units.

d) Marginal rate of substitution: MRS=-∂y/∂x=-Q'x/Q'y

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

#10: $$-1$$

If A increases 1 unit, B must decrease 1 unit to keep the production. So, if A decreases 1/4, B must increase 1/4 units.

e) Elasticity: E=Q'x*x/Q(x,y)

We first calculate the present value of the production:

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

So, the elasticity is:

#12: $\dfrac{\frac{1}{2}\cdot\frac{3}{4}}{\frac{1}{2}}$

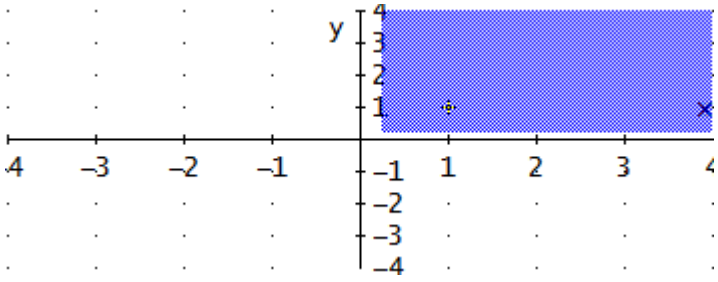
#13: $\frac{3}{4}$

The production would increase 0.75%.

f) Q(kx,ky)=(kx-1/4)^(1/2)*(ky-1/4)^(1/2) It is imposible to write Q (kx,ky) as k^α + Q(x,y). Q is not homogeneous.

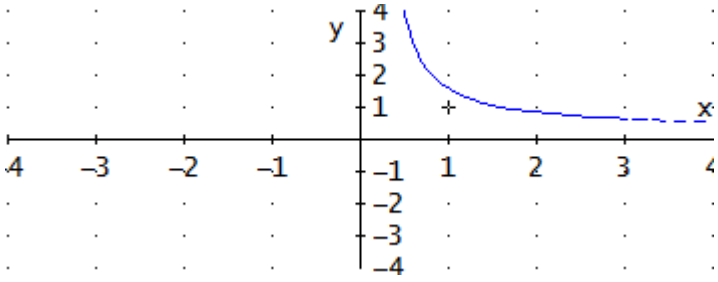
g) Dom Q= {(x,y) in R2 such that x>=1/4 and y>=1/4}

#14: $x \geq \frac{1}{4} \wedge y \geq \frac{1}{4}$



h) Isoquant of level 1.

#15: $\left(x - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2} = 1$



To calculate on point, I give one value to any of the variables. For

example x=1/2. I replace this value in the equation #16.

#16: $\left(\frac{5}{4} - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2} = 1$

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

Now I solve this equation to calculate the value of y.

#18: $\left(\frac{5}{4} - \frac{1}{4}\right)^{1/2} \cdot \left(y - \frac{1}{4}\right)^{1/2} = 1$

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

Now I solve this equation to calulate y.

#20: $\text{SOLVE}\left(\left[\frac{\sqrt{(4 \cdot y - 1)}}{2} = 1\right], [y]\right)$

#21: $\left[y = \frac{5}{4}\right]$

The point (5/4, 5/4) in on the isoquant of level 1.