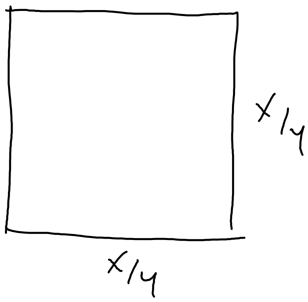
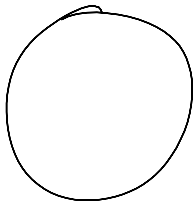
## 2014

den 23 mars 2011
10:33

Figurer :



$O = x$

$O = 1 - x$

Minimera summan av areorna :

Kvadraten: $A = \left(\frac{x}{4}\right)^2 = \frac{x^2}{16}$

Cirkeln : $r = \frac{O}{2\pi} = \frac{1-x}{2\pi}$

$$A = \pi r^2 = \pi \cdot \left(\frac{1-x}{2\pi}\right)^2 = \frac{(1-x)^2}{4\pi}$$

Total area : $A(x) = \frac{x^2}{16} + \frac{(1-x)^2}{4\pi} \qquad 0 \le x \le 1$

$$A'(x) = \frac{x}{8} - \frac{2(1-x)}{4\pi} = 0$$

$$\Leftrightarrow \quad (\cdot 8\pi)$$

$$\pi x - 4(1-x) = 0$$

$$\Leftrightarrow$$

$$\pi x - 4 + 4x = 0$$

$$\Leftrightarrow$$

$$x(\pi + 4) = 4$$

$$x = \frac{4}{\pi + 4}$$

Max el. min kontrolleras med $A''(x)$

$$A''(x) = \frac{1}{8} + \frac{2}{4\pi} \Rightarrow A''\left(\frac{4}{\pi+4}\right) > 0$$

så min.

Alltså ger $x = \frac{4}{\pi+4}$ minst sammanlagd area, och $O = x = \frac{4}{\pi+4}$.