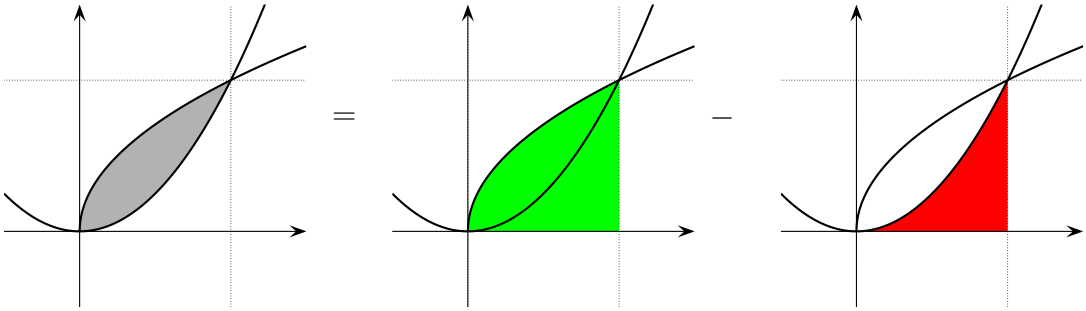
11.6



Déterminons les abscisses des points d'intersection des graphes de f et de g :

$x^2 = \sqrt{x}$

$x^4 = x$

$0 = x^4 - x = x\,(x^3 - 1) = x\,(x-1)\,(x^2 + x + 1)$

$x = 0$ ou $x = 1$

$$\int_0^1 \sqrt{x}\,dx - \int_0^1 x^2\,dx = \int_0^1 \left(\sqrt{x} - x^2\right) dx = \int_0^1 \left(x^{\frac{1}{2}} - x^2\right) dx = \frac{1}{\frac{3}{2}}\, x^{\frac{3}{2}} - \tfrac{1}{3}\, x^3 \Big|_0^1 =$$

$$\tfrac{2}{3}\, x\, \sqrt{x} - \tfrac{1}{3}\, x^3 \Big|_0^1 = \left(\tfrac{2}{3} \cdot 1 \cdot \sqrt{1} - \tfrac{1}{3} \cdot 1^3\right) - \left(\tfrac{2}{3} \cdot 0 \cdot \sqrt{0} - \tfrac{1}{3} \cdot 0^3\right) = \left(\tfrac{2}{3} - \tfrac{1}{3}\right) - (0 - 0) =$$

$\frac{1}{3} - 0 = \frac{1}{3}$