Let $I = \int_0^2 \sqrt{x^2+1}\, dx$.

What does I have in common with the following?

1. $f(x) = \dfrac{(x^2+1)^{\frac{1}{4}}}{\sqrt{\pi}}$
2. $X(t) = \left(t + 7\pi, \dfrac{t^2}{2} - 6\right)$
3. $g(x, y) = (\sqrt{x^2+y}, x-y)$ and $X(t) = (t, 1)$

4. The region bounded by the unit circle in the xy-plane and $h(x, y) =$

$$-2\ \arccos(x) \frac{1}{\sqrt{\frac{(\arccos(x))^2}{\pi^2}+1}} \pi^{-3} x^{-1} \frac{1}{\sqrt{1-x^2}} - 2\sqrt{\frac{(\arccos(x))^2}{\pi^2}+1}\pi^{-1} x^{-2}$$

$$-\arcsin(y) \frac{1}{\sqrt{\frac{(\arcsin(y))^2}{\pi^2}+1}} \pi^{-3} y^{-1} \frac{1}{\sqrt{1-y^2}} - \sqrt{\frac{(\arcsin(y))^2}{\pi^2}+1}\pi^{-1} y^{-2}$$