ii).

Area is given by

$$
\begin{aligned}
|\int_{-1}^{1} x^2| + |\int_{-1}^{1} -x^2| &= 2|\int_{-1}^{1} x^2| \\
&= 2\left(\frac{1}{3} - \frac{-1}{3}\right) \\
&= \frac{4}{3}
\end{aligned}
$$

iv).

First, note that $f(x)$ intersects $h(x)$ at $x = -\sqrt{2}, \sqrt{2}$, $g(x)$ intersects $f(x)$ at $\frac{-1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$, and the x axis at $-1, 1$. Given this, the area is given by:

$$
\begin{aligned}
&= \int_{-\sqrt{2}}^{\sqrt{2}} 2 - \int_{-\sqrt{2}}^{\sqrt{2}} x^2 - \int_{-1}^{1} 1 - x^2 + \left(\int_{-\frac{1}{\sqrt{2}}}^{\frac{1}{\sqrt{2}}} x^2 + 2\int_{1}^{\sqrt{2}} 1 - x^2\right) \\
&= \frac{8\sqrt{2}}{3} - 2 + \frac{2}{3} + \frac{1}{3\sqrt{2}} + 2\sqrt{2} - 1 - \frac{4\sqrt{2}}{3} + \frac{2}{3} \\
&= \frac{7}{\sqrt{2}} - \frac{8}{3}
\end{aligned}
$$

vi).

Know $\sqrt{x}$ is x^2 "rotated" nintey degrees, and know it intersects waith the vertical line at $y = \sqrt{2}$. So, really, this is same as finding:

$$
\begin{aligned}
\int_{0}^{\sqrt{2}} 2 - \int_{0}^{\sqrt{2}} x^2 &= 2\sqrt{2} - \frac{2\sqrt{2}}{3} \\
&= \frac{4\sqrt{2}}{3}
\end{aligned}
$$