diagonal of box is $4r + 2x$

$x$ is $\sqrt{3}r$

(on a 2d surface, it would be $\sqrt{2}$ but since we are in 3d, the diagonal of the triangle is $\sqrt{3} \ r$)

\[
\begin{align*}
\sqrt{1^2 + 1^2 + 1^2} &= \sqrt{3} \\
\sqrt{3} &= 4r + 2x \\
\sqrt{3} &= 4r + 2\sqrt{3}r \\
\sqrt{3} &= r(4 + 2\sqrt{3}) \\
r &= \frac{\sqrt{3}}{4 + 2\sqrt{3}} \\
&= \frac{4\sqrt{3} - 6}{16 - 12} \\
&= \sqrt{3} - \frac{3}{2}
\end{align*}
\]