16. *Proof (by mathematical induction):*

The formula is true for n = 0 : The formula holds for $n = 0$ because $\prod_{i=0}^{0}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right) = \frac{1}{1}\cdot\frac{1}{2} = \frac{1}{2}$ and $\frac{1}{(2\cdot 0+2)!} = \frac{1}{2}$ also.

If the formula is true for n = k then it is true for n = k + 1 : Suppose $\prod_{i=0}^{k}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right) = \frac{1}{(2k+2)!}$ for some integer $k \geq 0$. We must show that $\prod_{i=0}^{k+1}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right) = \frac{1}{(2\cdot(k+1)+2)!}$, or, equivalently, $\prod_{i=0}^{k+1}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right) = \frac{1}{((2k+4)!}$. But by the laws of algebra and substitution from the inductive hypothesis,

$$\begin{aligned}
\prod_{i=0}^{k+1}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right) &= \prod_{i=0}^{k}\left(\frac{1}{2i+1}\cdot\frac{1}{2i+2}\right)\cdot\left(\frac{1}{2(k+1)+1}\cdot\frac{1}{2(k+1)+2}\right) \\
&= \left(\frac{1}{(2k+2)!}\right)\cdot\left(\frac{1}{2(k+1)+1}\cdot\frac{1}{2(k+1)+2}\right) \\
&= \frac{1}{(2k+2)!}\cdot\frac{1}{2k+3}\cdot\frac{1}{2k+4} \\
&= \frac{1}{(2k+4)!}
\end{aligned}$$

[as was to be shown].