Solution to Problem 19) Euler's infinite product representation of $\sin x/x$ is written

$$\sin x/x = \prod_{n=1}^{\infty} \left(1 - \frac{x^2}{n^2\pi^2}\right).$$

Setting $x = \pi/2$ in the above equation yields the Wallis product formula, as follows:

$$\frac{2}{\pi} = \prod_{n=1}^{\infty} \left(1 - \frac{1}{4n^2}\right) = \prod_{n=1}^{\infty} \left(\frac{4n^2-1}{4n^2}\right) = \prod_{n=1}^{\infty} \left(\frac{2n-1}{2n} \cdot \frac{2n+1}{2n}\right).$$
