

The Part's The Thing

Compute each of the following:

$$a. \left(1 - \frac{1}{2^2}\right)$$

$$b. \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)$$

$$c. \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right)$$

$$d. \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right)\left(1 - \frac{1}{5^2}\right)$$

Without actually computing the result, give a good argument as to what common fraction the following might be.

$$\left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right)\left(1 - \frac{1}{5^2}\right)\dots\left(1 - \frac{1}{50^2}\right)$$