



This brainteaser was supplied by the Mathematical Olympiads for Elementary and Middle Schools (www.moems.org).

If 18 students occupy $\frac{3}{5}$ of the seats in the classroom, how many students would occupy $\frac{2}{3}$ of the seats in the room?



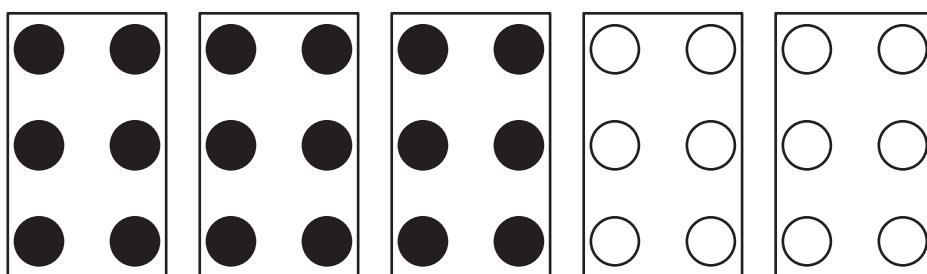
Solution: 20.

One approach is to use algebra to find the answer. If there are n seats in the room, then an equation can be solved as follows:

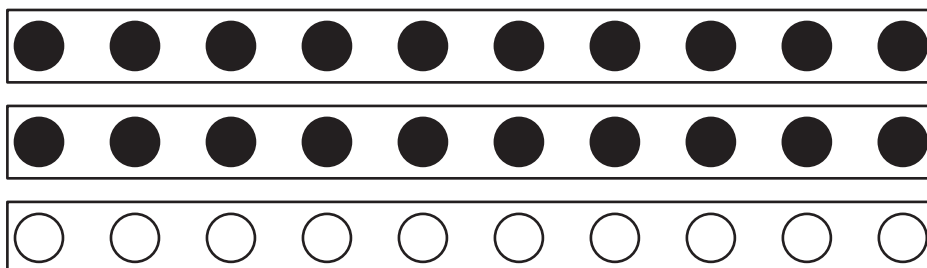
$$\begin{aligned}\frac{3}{5}n &= 18 \\ \frac{5}{3} \times \frac{3}{5}n &= \frac{5}{3} \times 18 \\ n &= 30\end{aligned}$$

Consequently, if there are 30 seats, then $\frac{2}{3} \times 30 = 20$ students would fill $\frac{2}{3}$ of the seats.

A more intuitive approach might involve a visual representation. If $\frac{3}{5}$ of the classroom is 18 seats, then the entire classroom, or $\frac{5}{5}$, must be 30 seats, as shown below:



Another visual representation can be used to show that $\frac{2}{3}$ of the classroom is 20 seats.



Finally, a purely numeric solution relies on the fact that $\frac{3}{5}$ is equivalent to $\frac{18}{30}$, which implies that there are 30 seats in the classroom. Then $\frac{2}{3} \times 30 = 20$ seats.