

ZMATH 2014e.00680

Ackermann, E.R.; Grobler, T.L.; Kleynhans, W.; Olivier, J.C.; Salmon, B.P.; van Zyl, A.J.
Cavalieri integration.

Quaest. Math. 35, No. 3, 265-296 (2012).

Summary: We use Cavalieri's principle to develop a novel integration technique which we call Cavalieri integration. Cavalieri integrals differ from Riemann integrals in that non-rectangular integration strips are used. In this way we can use single Cavalieri integrals to find the areas of some interesting regions for which it is difficult to construct single Riemann integrals. We also present two methods of evaluating a Cavalieri integral by first transforming it to either an equivalent Riemann or Riemann-Stieltjes integral by using special transformation functions $h(x)$ and its inverse $g(x)$, respectively. Interestingly enough it is often very difficult to find the transformation function $h(x)$, whereas it is very simple to obtain its inverse $g(x)$.

Classification: I55

Keywords: Cavalieri integral; Riemann integral; Riemann-Stieltjes integral; integration; method of indivisibles

doi:10.2989/16073606.2012.724937