```r
ternary <- function(f, lower, upper, tol) {

    f.lower <- f(lower)

    f.upper <- f(upper)

    while (abs(upper - lower) > 2 * tol) {

        x1 <- (2 * lower + upper) / 3

        f.x1 <- f(x1)

        x2 <- (lower + 2 * upper) / 3

        f.x2 <- f(x2)

        if (f.x1 < f.x2) {

            upper <- x2

            f.upper <- f.x2

        } else {

            lower <- x1

            f.lower <- f.x1

        }

    }

    return((upper + lower) / 2)

}
```