

Exercises

E15.1 [1BC] We define the Beta function as

$$B(x, y) = \int_0^1 t^{x-1}(1-t)^{y-1} dt .$$

- (a) Show that the integral exists (finite) if and only if $x, y > 0$.
- (b) Note that $B(x, y) = B(y, x)$
- (c) Relate $B(n, m)$ to $B(n-1, m+1)$. Then calculate the value of $B(n, m)$ for n, m natural positives.
- (d) Use the result to calculate

$$\int_0^{\pi/2} \sin(t)^9 \cos(t)^7 dt .$$

Solution 1. [1BD]