

## Answer on Question #82986 – Math – Calculus

### Question

find the intervals in  $\mathbb{R}$  over which definite integral  $(-1$  to  $x)$  of  $(t+1)^3 \cdot e^t \cdot dt$  is decreasing

### Solution

Let  $f(x) = \int_{-1}^x (t+1)^3 e^t dt$ . Then  $f'(x) = (x+1)^3 e^x$ .

In order to find the interval over which the function  $f(x)$  decreases, it is necessary to solve the inequality  $f'(x) < 0$ . That is  $(x+1)^3 e^x < 0$ .

Since  $e^x > 0$  for any  $x$ , then  $f'(x) < 0$  for  $(x+1)^3 < 0$ , i.e. for  $x < -1$ .

### Answer:

$x \in (-\infty; -1)$  is interval over which definite integral  $(-1$  to  $x)$  of  $(t+1)^3 \cdot e^t \cdot dt$  is decreasing.