

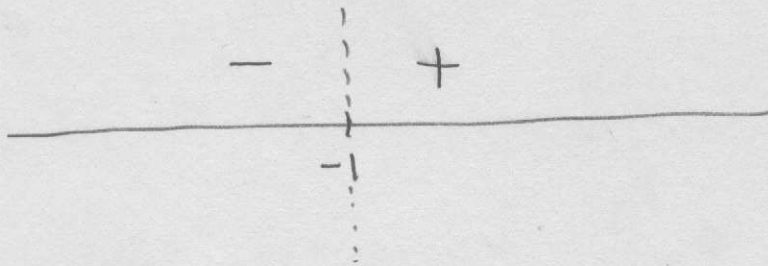
Quiz 1

① Find the intervals of inc/dec. of $f(x) = xe^x$ using a sign chart.

$$f'(x) = (1)e^x + xe^x = e^x(1+x)$$

set $e^x(1+x) = 0$ to find the critical numbers.

e^x is never zero so $1+x=0$ which implies $x=-1$ is the only crit. #.



$f(x)$ is decreasing on $(-\infty, -1)$

$f(x)$ is increasing on $(-1, \infty)$

② Evaluate $\int_1^2 \frac{1}{8-3x} dx$

$$\begin{aligned} \text{Let } u &= 8-3x \\ du &= -3dx \\ \text{or} \\ -\frac{1}{3} du &= dx \end{aligned}$$

Express final answer as a single logarithm with no negatives.

$$= -\frac{1}{3} \int_5^2 \frac{1}{u} du$$

$$= -\frac{1}{3} \left[\ln|u| \right]_5^2 = -\frac{1}{3} \left[\ln 2 - \ln 5 \right] = -\frac{1}{3} \ln \left(\frac{2}{5} \right) = \ln \left(\frac{2}{5} \right)^{-1/3}$$

$$= \ln \left(\frac{5}{2} \right)^{1/3}$$