

2.2. π

$$1) \int_0^{\pi} x \cos x dx = \left/ \begin{array}{l} \text{Богоявлен по замене} \\ x = u, du = dx \\ \cos x dx = dv, v = \sin x, \text{ тогда} \end{array} \right.$$

$$= x \sin x \Big|_0^{\pi} - \int_0^{\pi} \sin x dx = x \sin x + \cos x \Big|_0^{\pi} =$$

$$= \pi \cdot 0 - 1 - 1 = -2.$$

$$2) \int_0^{1/e} \ln(x+1) dx = \left/ \begin{array}{l} \text{Богоявлен по замене} \\ u = \ln(x+1), dx = dv \\ du = \frac{dx}{x+1}, v = x \end{array} \right.$$

$$= x \ln(x+1) - \int_0^{1/e} \frac{x dx}{x+1} = x \ln(x+1) -$$

$$- \int_0^{1/e} \frac{(x+1-1) dx}{x+1} = x \ln(x+1) - \int_0^{1/e} dx + \int_0^{1/e} \frac{dx}{x+1} =$$

$$= x \ln(x+1) - x + \ln(x+1) \Big|_0^{1/e} =$$

$$= \ln(x+1)(x+1) - x + 1 - 1 \Big|_0^{1/e} = (x+1)(\ln(x+1) - 1) \Big|_0^{1/e}$$

$$= \frac{1+e}{e} (\ln \frac{1+e}{e} - 1) + 1 = 0,061.$$