

S. 39/2

$$(1) \lim_{b \rightarrow \infty} \int_1^b \frac{1}{(x+1)^2} dx = \lim_{b \rightarrow \infty} \left[-\frac{1}{x+1} \right]_1^b = \lim_{b \rightarrow \infty} \left(-\frac{1}{b+1} + \frac{1}{2} \right) = \frac{1}{2}$$

$$(2) \lim_{b \rightarrow \infty} \int_2^b e^{-\frac{1}{2}x} dx = \lim_{b \rightarrow \infty} \left[-2e^{-\frac{1}{2}x} \right]_2^b = \lim_{b \rightarrow \infty} \left(-2e^{-\frac{1}{2}b} + 2e^{-1} \right) = \frac{2}{e} \approx 0,74$$

$$(3) \lim_{a \rightarrow 0} \int_a^1 \frac{2}{x^3} dx = \lim_{a \rightarrow 0} \left[-\frac{1}{x^2} \right]_a^1 = \lim_{a \rightarrow 0} \left(-1 + \frac{1}{a^2} \right) = +\infty$$

$$(4) \lim_{a \rightarrow 0} \int_a^4 \frac{4}{\sqrt{x}} dx = \lim_{a \rightarrow 0} \int_a^4 (4 \cdot x^{-\frac{1}{2}}) dx = \lim_{a \rightarrow 0} \left[8\sqrt{x} \right]_a^4$$
$$= \lim_{a \rightarrow 0} \left(16 - \frac{8\sqrt{a}}{\sqrt{a}} \right) = 16$$