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Quiz – October 19, 2004

Find $\int_{-2}^{-1} \frac{dx}{(x+1)^{4/3}}$.

Answer: This is an improper integral because the function $\frac{1}{(x+1)^{4/3}}$ becomes infinite as x approaches -1 . The integral is equal to

$$\begin{aligned} \lim_{b \rightarrow -1^-} \int_{-2}^b \frac{dx}{(x+1)^{4/3}} &= \lim_{b \rightarrow -1^-} \left. \frac{-3}{(x+1)^{1/3}} \right|_{-2}^b = \lim_{b \rightarrow -1^-} \frac{-3}{(b+1)^{1/3}} - \frac{-3}{(-2+1)^{1/3}} \\ &= +\infty - 1 = \boxed{+\infty}. \end{aligned}$$