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for home

1 -st kind

direct computation

$$\int_1^{\infty} x^{-\frac{1}{3}}\,dx \to \infty \qquad \int_1^{\infty} x^{-\frac{4}{3}}\,dx \to 3$$

$$\int_1^{\infty} x^{-\frac{5}{4}}\,dx \to 4 \qquad \int_1^{\infty} x^{-\frac{5}{2}}\,dx \to \frac{2}{3} \qquad \int_1^{\infty} x^{-2008}\,dx \to \frac{1}{2007} \qquad \int_1^{\infty} x^{-\frac{2008}{2007}}\,dx \to 2007$$

by parts

$$\int_1^{\infty} x^{-3}\cdot\ln(x)\,dx \to \frac{1}{4} \qquad \int_1^{\infty} x^{-3}\cdot\ln(x)^2\,dx \to \frac{1}{4} \qquad \int_1^{\infty} x^{-3}\cdot\ln(x)^3\,dx \to \frac{3}{8} \qquad \int_1^{\infty} x^{-3}\cdot\ln(x)^4\,dx \to \frac{3}{4}$$

$$\int_1^{\infty} x^{-5}\cdot\ln(x)\,dx \to \frac{1}{16} \qquad \int_1^{\infty} x^{-5}\cdot\ln(x)^2\,dx \to \frac{1}{32} \qquad \int_1^{\infty} x^{-5}\cdot\ln(x)^3\,dx \to \frac{3}{128} \qquad \int_1^{\infty} x^{-5}\cdot\ln(x)^3\,dx \to \frac{3}{128}$$

$$\int_0^{\infty} x\cdot e^{-2x}\,dx \to \frac{1}{4} \qquad \int_0^{\infty} x^2\cdot e^{-2x}\,dx \to \frac{1}{4} \qquad \int_0^{\infty} x^3\cdot e^{-2x}\,dx \to \frac{3}{8} \qquad \int_0^{\infty} x^4\cdot e^{-2x}\,dx \to \frac{3}{4}$$

direct

$$\int_0^{\infty} \frac{1}{\frac{1}{4} + x^2}\,dx \to \pi \qquad \int_0^{\infty} \frac{1}{9 + x^2}\,dx \to \frac{1}{6}\cdot\pi \qquad \int_0^{\infty} \frac{x^2}{1 + x^6}\,dx \to \frac{1}{6}\cdot\pi$$

by parts

$$\int_0^{\infty} \frac{1}{\left(4 + x^2\right)^2}\,dx \to \frac{1}{32}\cdot\pi \qquad \int_0^{\infty} \frac{1}{\left(4 + x^2\right)^3}\,dx \to \frac{3}{512}\cdot\pi$$

$$\int_0^{\infty} e^{-2x}\cdot\sin(x)\,dx \to \frac{1}{5} \qquad \int_0^{\infty} e^{-2x}\cdot\cos(x)\,dx \to \frac{2}{5}$$

$$\int_1^{10000} \frac{\cos(\ln(x))}{x^2}\,dx \to \frac{1}{20000}\cdot\frac{-1 + \tan(2\cdot\ln(2) + 2\cdot\ln(5))^2 + 2\cdot\tan(2\cdot\ln(2) + 2\cdot\ln(5))}{1 + \tan(2\cdot\ln(2) + 2\cdot\ln(5))^2} + \frac{1}{2} = 0.500059494708039$$

$$\int_{1}^{10000} \frac{\cos(\ln(x))}{x^4}\,dx \to \frac{1}{10000000000000}\cdot\frac{-3+2\cdot\tan(2\cdot\ln(2)+2\cdot\ln(5))+3\cdot\tan(2\cdot\ln(2)+2\cdot\ln(5))^2}{1+\tan(2\cdot\ln(2)+2\cdot\ln(5))^2}+\frac{3}{10} = 0.300000000$$

split to simple fractions and compute antiderivative

$$\int_{0}^{\infty} \frac{1}{x^2+6x+5}\,dx \to \frac{1}{4}\cdot\ln(5) \qquad \int_{0}^{\infty} \frac{1}{(x+1)\cdot(x+3)\cdot(x+5)}\,dx \to \frac{1}{4}\cdot\ln(3)-\frac{1}{8}\cdot\ln(5)$$

change variable

$$\int_{0}^{\infty} x\cdot e^{\frac{-x^2}{2}}\,dx \to 1$$

$$\int_{0}^{\infty} x\cdot e^{\frac{-x^2}{2}}\,dx \to 1 \qquad \int_{0}^{\infty} x^{17}\cdot e^{-x^3}\,dx \to 40 \qquad \int_{0}^{\infty} x^{7}\cdot e^{-x^4}\,dx \to \frac{1}{4}$$

$$\int_{0}^{\infty} x^{5}\cdot e^{-x^2}\,dx \to 1 \qquad \int_{0}^{\infty} x^{11}\cdot e^{-x^3}\,dx \to 2 \qquad \int_{0}^{\infty} x^{13}\cdot e^{-x^7}\,dx \to \frac{1}{7}$$

Let Known $\int_{0}^{\infty} e^{-\frac{x^2}{2}}\,dx \to \frac{1}{2}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}}$ $\qquad \int_{-\infty}^{\infty} e^{\frac{-x^2}{2}}\,dx \to 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}}$

by parts

$$\int_{0}^{\infty} x^2\cdot e^{\frac{-x^2}{2}}\,dx \to \frac{1}{2}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}} \qquad \int_{0}^{\infty} x^4\cdot e^{\frac{-x^2}{2}}\,dx \to \frac{3}{2}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}} \qquad \int_{0}^{\infty} x^6\cdot e^{\frac{-x^2}{2}}\,dx \to \frac{15}{2}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}}$$

$$\int_{0}^{\infty} x^2\cdot e^{\frac{-x^6}{2}}\,dx \to \frac{1}{6}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}} \qquad \int_{0}^{\infty} x^3\cdot e^{\frac{-x^8}{2}}\,dx \to \frac{1}{8}\cdot 2^{\frac{1}{2}}\cdot\pi^{\frac{1}{2}}$$

2 -nd kind

direct

$$\int_{0}^{1} x^{-\frac{1}{3}}\,dx \to \frac{3}{2} \qquad \int_{0}^{1} x^{-\frac{5}{4}}\,dx \to \infty \qquad \int_{0}^{1} \frac{1}{\sqrt[3]{1-x}}\,dx \to \frac{3}{2} \qquad \int_{0}^{1} \frac{x}{\sqrt[3]{1-x}}\,dx \to \frac{9}{10}$$

by parts

$$\int_0^1 \ln(x)^2\,dx \rightarrow 2 \qquad \int_0^1 x\cdot\ln(x)^2\,dx \rightarrow \frac{1}{4} \qquad \int_0^1 x^2\cdot\ln(x)^2\,dx \rightarrow \frac{2}{27} \qquad \int_0^1 x^3\cdot\ln(x)^2\,dx \rightarrow \frac{1}{32}$$

direct

$$\int_0^{\frac{1}{2}} \frac{1}{\sqrt{1-x^2}}\,dx \rightarrow \frac{1}{6}\cdot\pi$$

change variable

$$\int_{\frac{3}{5}}^{\frac{4}{5}} \frac{x}{\sqrt{1-x^2}}\,dx \rightarrow \frac{1}{5}$$

$$\int_0^{\frac{1}{2}} \frac{x^2}{\sqrt{1-x^2}}\,dx \rightarrow \frac{-1}{8}\cdot 3^{\frac{1}{2}} + \frac{1}{12}\cdot\pi \qquad \int_0^{\frac{1}{2}} \frac{x^3}{\sqrt{1-x^2}}\,dx \rightarrow \frac{-3}{8}\cdot 3^{\frac{1}{2}} + \frac{2}{3}$$

$$\int_0^{\frac{1}{\sqrt{2}}} \frac{x}{\sqrt{1-x^4}}\,dx \rightarrow \frac{1}{12}\cdot\pi \qquad \int_0^1 \frac{x^5}{\sqrt{1-x^4}}\,dx \rightarrow \frac{1}{8}\cdot\pi$$

$$\int_0^{\frac{1}{2}} \frac{1}{\sqrt{x-x^2}}\,dx \rightarrow \frac{1}{2}\cdot\pi$$

$$\int_0^{\frac{\pi}{2}} \sin(x)\cdot\ln(\cos(x))\,dx \rightarrow -1$$

$$\int_0^{\frac{\pi}{2}} \sin(x)^3\cdot\ln(\cos(x))\,dx \rightarrow \frac{-8}{9} \qquad \int_0^{\frac{\pi}{2}} \sin(x)\cdot\cos(x)\cdot\ln(\cos(x))\,dx \rightarrow \frac{-1}{4} \qquad \int_0^{\frac{\pi}{2}} \sin(x)\cdot\cos(x)^2\cdot\ln(\cos(x))\,dx \rightarrow \frac{-1}{9}$$

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