8.8 p. 585 #19–45 odd

19) $\int_{-\infty}^{0} xe^{-2x}\,dx$

u	dv
+ x	e^{-2x}
− 1	$-\frac{1}{2}e^{-2x}$
+ 0	$\frac{1}{4}e^{-2x}$

$$\lim_{b\to-\infty}\int_{b}^{0} xe^{-2x}\,dx$$

$$-\frac{1}{2}xe^{-2x}-\frac{1}{4}e^{-2x}\Big]_{b}^{0}$$

$$-\frac{1}{2}0e^{0}-\frac{1}{4}e^{0}-\left[-\frac{b}{2e^{2b}}-\frac{1}{4e^{2b}}\right]$$

$$\lim_{b\to-\infty} -\frac{1}{4}+\frac{be^{\infty}}{2}+\frac{1e^{\infty}}{4} \overset{(-\infty)}{=} -\infty$$

Diverges

21) $\int_{0}^{\infty} x^2e^{-x}\,dx$

u	dv
+ x^2	e^{-x}
− $2x$	$-e^{-x}$
+ 2	e^{-x}
− 0	$-e^{-x}$

$$\lim_{b\to\infty}\int_{b}^{b} x^2e^{-x}\,dx$$

Lipet $u=e^{-x}$ $dv=\cos x$

23) $e^{-x}\cos x+\int \sin x\,e^{-x}\,dx$

$$-e^{-x}\cos x-\int$$

27) $\int_{-\infty}^{\infty} \frac{2}{4+x^2}\,dx = \int_{-\infty}^{0} \frac{2}{4+x^2}\,dx + \int_{0}^{\infty} \frac{2}{4+x^2}\,dx$

$\lim_{b\to-\infty} \arctan\left(\frac{x}{2}\right)\Big]_b^0 \qquad \lim_{b\to\infty} \arctan\left(\frac{x}{2}\right)\Big]_0^b$

$0-\left(-\frac{\pi}{2}\right) + \frac{\pi}{2} - 0 = \frac{2\pi}{2} = \boxed{\pi}$

\# 45) $\int_0^2 \frac{1}{\sqrt[3]{x-1}}\,dx = \int_0^1 \frac{1}{\sqrt[3]{x-1}} + \int_1^2 \frac{1}{\sqrt[3]{x-1}}$

$\lim_{b\to1^-} \frac{3}{2}(x-1)^{3/2}\Big]_0^b + \lim_{b\to1^+} \frac{3}{2}(x-1)^{3/2}\Big]_b^2$

$\frac{-3}{2} + +\left(\frac{+3}{2}\right) = \boxed{0}$