07-08 A1

.

$1.\lim_{x\ 0}\frac{\sin 3x}{x} f \ \frac{\sin 2x}{x} \quad 3f\ 2 \quad 9$

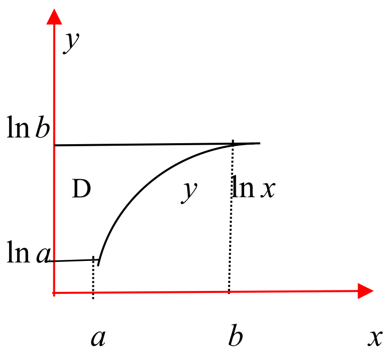
$2.K \quad \frac{|y"|}{1 \quad y'^{\ 2\ \ 2/3}} \quad \frac{2a}{1 \quad y'^{\ 2\ \ 2/3}} \qquad |y'| \qquad y' \quad 2ax \quad b \quad 0 \quad x \qquad \frac{b}{2a}$

$3.\tan y \quad x \quad y, \qquad \sec^2 ydy \quad dx \quad dy \qquad dy \quad \cot^2 ydx$

$4.\cos\langle a,b\rangle \quad \frac{a\ \ b}{|a||b|} \quad \frac{3 \quad 2 \quad 2}{\sqrt{9 \quad 1 \quad 4}\sqrt{1 \quad 1 \quad 4}} \quad \frac{3}{2\sqrt{21}}$

$1.\lim_{x\ 0} 1 \quad \cos x^{\frac{3}{\cos x}} \quad 2^3 \quad 8$

$2A \quad \int_{\ln a}^{\ln b} e^y dy \qquad \int_0^a \ln b \quad \ln a\ dx \qquad \int_a^b \ln b \quad \ln x\ dx$



$3.M \quad \int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin x}{1 \quad x^2}\cos^4 xdx \quad 0$

$.N \quad 2\int_0^{\frac{\pi}{2}}\cos^4 xdx \quad 0, P \qquad 2\int_0^{\frac{\pi}{2}}\cos^4 x \quad 0$

$M \quad N \quad P$

$4. \quad x \quad x_0 \qquad U\ x_0,\delta \qquad , \ f\ x \quad f\ x_0 \quad \frac{f'''\ x_0}{3!}\ x \quad x_0^{\ \ 3}$

$f'\ x \quad f'''\ x_0 \quad x \quad x_0^{\ \ 2}, \qquad 0$

$f'\ x \quad 0 \quad x \quad x_0 \quad f'\ x \quad 0 \quad x \quad x_0$

$f''\ x \quad 2f'''\ x_0 \quad x \quad x_0 \qquad x_0, f\ x_0$

$1.\lim_{h\ 0}\frac{f\ a \quad h \quad f\ a \quad 2h}{h} \quad \lim_{h\ 0}\frac{f\ a \quad h \quad f\ a}{h} \quad 2\lim_{h\ 0}\frac{f\ a \quad 2h \quad f\ a}{2h} \qquad f'\ a \quad 2f'\ a \quad f'\ a$

$2\lim_{x\ \frac{\pi}{2}} x \quad \frac{\pi}{2} \quad \cot 2x \quad \overset{u\ \ x\ \ \frac{\pi}{2}}{\ } \lim_{u\ 0}\frac{u}{\tan 2u} \quad \frac{1}{2}$

$1\ \frac{10^{2\arccos x}}{\sqrt{1\quad x^2}}dx \qquad \frac{1}{2}\ 10^{2\arccos x}d\ 2\arccos x \qquad \frac{10^{2\arccos x}}{2\ln 10}\quad C$

$2.\ {}_0^2 f\ x\quad 1\,dx^{\ x\ 1\ u}\ {}_1^1 f\ u\ du \quad {}_1^0\frac{1}{1\quad e^x}dx \quad {}_0^1\frac{1}{1\quad x}dx \quad \ln 2 \quad {}_1^0\frac{1\quad e^x\quad e^x}{1\quad e^x}dx$

$\ln 2\quad 1\quad \ln 1\quad e^x\Big|_1^0 \quad 2\ln 2\quad 1\quad \ln 1\quad e^{\ 1}$

$3.\ {}_0^{\frac{\pi}{2}} e^{2x}\sin 2xdx \quad \frac{1}{2}e^{2x}\sin 2x\Big|_0^{\frac{\pi}{2}} \quad {}_0^{\frac{\pi}{2}} e^{2x}\cos 2xdx \quad \frac{1}{2}\ e^{2x}\cos 2x\Big|_0^{\frac{\pi}{2}} \quad e^{2x}\sin 2xdx$

$\frac{1}{2}e^{\pi}\quad \frac{1}{2}\quad {}_0^{\frac{\pi}{2}} e^{2x}\sin 2xdx \quad {}_0^{\frac{\pi}{2}} e^{2x}\sin 2xdx \quad \frac{1}{4}\ e^{\pi}\quad 1$

$1.x_t{}'\big|_{t\ 0}\quad 2e^t\quad 2, y_t{}'\big|_{t\ 0}\quad e^{\ t}\quad 1, x\ 0\quad 2, y\ 0\quad 1\quad K\quad \frac{2}{1}\quad 2.K\quad \frac{1}{2}$

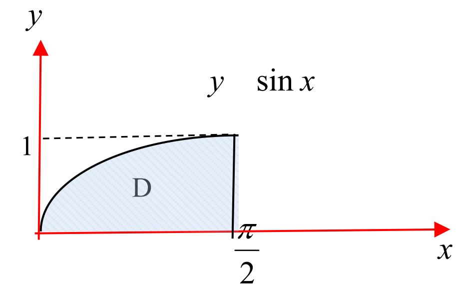
$y\quad 1\quad 2\ x\quad 2\qquad y\quad 2x\quad 5$

$y\quad 1\quad \frac{1}{2}\ x\quad 2\qquad y\quad \frac{1}{2}x$

$2.V\quad \frac{1}{3}\pi r^2 h\quad \frac{1}{3}\pi h\ 20^2\quad h^2\qquad V'\quad \frac{400}{3}\pi\quad \pi h^2\quad 0\quad h\quad \frac{20}{\sqrt{3}}$

$h\quad \frac{20}{\sqrt{3}}$

$3.V\quad 2\pi\ {}_0^{\frac{\pi}{2}} xydx\quad 2\pi\ {}_0^{\frac{\pi}{2}} x\sin xdx\quad 2\pi\quad x\cos x\quad \sin x\ {}_0^{\frac{\pi}{2}}\quad 2\pi$



$A,\quad \lim_{n} x_n\quad A$

$x_n\quad \sqrt{2\quad x_n}\qquad ,\quad A\quad \sqrt{2\quad A}\qquad A\quad 2$

$|x_n\quad 2|\quad \left|\sqrt{2\quad x_{n\ 1}}\quad 2\right|$

$\left|\frac{x_{n\ 1}\quad 2}{\sqrt{2\quad x_{n\ 1}}\quad 2}\right|\quad \frac{1}{4}|x_{n\ 1}\quad 2|\quad \frac{1}{4^2}|x_{n\ 2}\quad 2|.....\quad \frac{1}{4^{n\ 1}}|x_1\quad 2|\quad 0\ n\quad 0$

$F'\ x \quad f\ x \quad \dfrac{1}{f\ x} \quad 2 \quad 0 \qquad F\ x$

$2\ F\ b \quad \int_a^b f\ t\ dt \quad 0, F\ a \quad \int_b^a \dfrac{1}{f\ t} dt \quad 0$

$F\ b\ F\ a \quad 0, \quad F\ x$,

$e^x\ f\ x \quad f'\ x \quad 0 \quad e^x f\ x\ ' \quad 0 \quad e^x f\ x \quad C$

$f\ 0 \quad 1 \quad C \quad 1. \quad f\ x \quad e^{x}$

08-09 A1

$1.\lim_{x\ 0}\ x\sin\dfrac{1}{x} \quad \dfrac{1}{x}\sin x \quad 0 \quad 1 \quad 1$

$2.y' \quad f'\ \ln x\ \dfrac{1}{x} \quad dy \quad \dfrac{f'\ \ln x}{x}dx$

$3. \quad e^x \quad 3\cos x\ dx \quad e^x \quad 3\sin x \quad C$

$4. \quad \int_a^a x^3 \quad \sin^3 x\ dx \quad 0$

$1.\lim_{x\ 0}\dfrac{f\ x \quad f\ 0}{x} \quad f'\ 0 \quad 2$

$2.y \quad x \qquad y\ x$

$3.\overrightarrow{NM} \quad 3,\ 4,5\ .\overrightarrow{NP} \quad 1,\ 2,2\ .\cos \quad MNP \quad \dfrac{\overrightarrow{NM}\ \ \overrightarrow{NP}}{\left|\overrightarrow{NM}\right|\left|\overrightarrow{NP}\right|} \quad \dfrac{3 \quad 8 \quad 10}{\sqrt{50 \quad 9}} \quad \dfrac{\sqrt{2}}{2} \qquad MNP \quad \dfrac{\pi}{4}$

$4.f'''\ x \quad 0, f''\ 0 \quad 0 \quad f''\ x \quad 0 \quad f'\ x$

$f\ x$, $f'\ 0 \quad \dfrac{f\ 1 \quad f\ 0}{1 \quad 0} \quad f'\ \xi \quad f'\ 1\ .\xi \quad 0,1$

$5. \quad \int_0^1 f\ x\,dx \quad A \quad f\ x \quad x \quad 2A \qquad 0,1$, $A \quad \dfrac{1}{2} \quad 2A \quad A \quad \dfrac{1}{2}$

$1.\lim_{x\ 0}\dfrac{\tan x \quad \sin x}{\sin^3 x} \quad \lim_{x\ 0}\dfrac{\sin x\ 1 \quad \cos x}{\cos x \sin^3 x} \quad \lim_{x\ 0}\dfrac{x\ \ \frac{1}{2}x^2}{x^3} \quad \dfrac{1}{2}$

2.

$$3.\lim_{x\ \ 0}\ \sin x^{\ x}\quad \lim_{x\ \ 0} e^{x\ln\sin x}\quad \lim_{x\ \ 0} e^{\frac{\frac{\ln\sin x}{1}}{x}\ \frac{}{}.}\quad \lim_{x\ \ 0} e^{\frac{x^2}{\tan x}}\quad e^0\quad 1$$

$$1.x'\quad 2t, y'\quad \sin t.\frac{dy}{dx}\quad \frac{y'}{x'}\quad \frac{\sin t}{2t}.\frac{d^2y}{dx^2}\quad \frac{d\ \frac{dy}{dx}}{dt}\ \frac{dt}{dx}\quad \frac{\cos t 2t\quad 2\sin t}{4t^2 2t}\quad \frac{\sin t\quad t\cos t}{4t^3}$$

$$2.\ \frac{xe^{x^2}}{1\quad 2e^{x^2}}dx\quad \frac{1}{2}\ \frac{d\ e^{x^2}}{1\quad 2e^{x^2}}\quad \frac{1}{4}\ln\left|1\quad 2e^{x^2}\right|\quad C$$

$$3.\ {}_1^4\frac{\ln x}{\sqrt{x}}dx\quad 2\sqrt{x}\ln x\Big|_1^4\quad {}_1^4\frac{2}{\sqrt{x}}dx\quad 8\ln 2\quad 4\sqrt{x}\Big|_1^4\quad 8\ln 2\quad 4$$

$$F\ x\quad \sin x\quad \tan x\quad 2x.F'\ x\quad \cos x\quad \sec^2 x\quad 2\quad \cos x\quad \tan^2 x\quad 1$$
$$G\ x\quad \cos x\quad 1\quad \tan^2 x.G'\ x\quad \sin x\quad 2\tan x\sec^2 x\quad \sin x\ 2\sec^3 x\quad 1$$
$$\because 0\quad \cos x\quad 1.x\quad 0,\frac{\pi}{2}\quad \sec x\quad \frac{1}{\cos x}\quad 1.\quad \sec^3 x\quad 1\quad 0$$
$$G'\ x\quad 0.G\ 0\quad 0.\quad G\ x\quad 0,\quad f'\ x\quad 0.f\ 0\quad 0.\quad f\ x\quad 0$$
$$\sin x\quad \tan x\quad 2x$$

$$x\quad {}_\pi^x f\ x\ dx\quad {}_\pi\ f\ x\ dx\quad {}^x f\ x\ dx\quad 1\quad {}^x f\ x\ dx$$

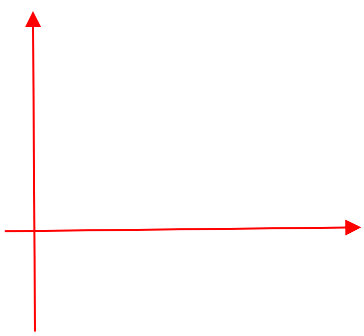
$$x\quad 0.\quad x\quad 1.0\quad x\quad \pi,\quad x\quad 1\quad {}^x f\ x\ dx\quad 1\quad {}_0^x\frac{1}{2}\sin xdx\quad 1\quad \frac{1}{2}\quad \cos x\Big|_0^x\quad \frac{1}{2}\quad \frac{1}{2}\cos x$$

$$x\quad \pi.\quad x\quad 1\quad {}^x f\ x\ dx\quad 1\quad {}^0\ 0dx\quad {}_0^\pi\frac{1}{2}\sin xdx\quad {}_\pi^x 0dx\quad 0$$

$$x\quad \begin{matrix} 1 & ,x\quad 0 \\ \frac{1}{2}\quad \frac{1}{2}\cos x & x\quad \pi \\ 0 & ,x\quad \pi \end{matrix}$$

$$f\ x\quad {}_a^x f\ x\ dx\quad f\ a\quad {}_a^a f\ x\ dx\quad 0\qquad .f'\ x\quad f\ x\quad f\ x\quad Ce^x$$

$$x\quad a.f\ a\quad Ce^a\quad 0\quad C\quad 0\quad f\ x\quad \begin{matrix} 0,x\quad a \\ Ce^x,x\quad a \end{matrix}$$



$S \quad \int_0^1 ax \quad bx^2 dx \quad \frac{a}{2} \quad \frac{b}{3} \quad \frac{4}{9} \quad b \quad \frac{4}{3} \quad \frac{3}{2}a$

$V \quad \pi \int_0^1 y^2 dx \quad \pi \int_0^1 a^2x^2 \quad \frac{4}{3} \quad \frac{3}{2}a^{\;2} \quad x^4 \quad 2a \quad \frac{4}{3} \quad \frac{3}{2}a \quad x^3 \quad dx \quad \pi \quad \frac{1}{3}a^2 \quad \frac{1}{5} \quad \frac{4}{3} \quad \frac{3}{2}a^{\;2} \quad \frac{a}{2} \quad \frac{4}{3} \quad \frac{3}{2}a$

$V' \quad \pi \quad \frac{2}{3}a \quad \frac{3}{5} \quad \frac{4}{3} \quad \frac{3}{2}a \quad \frac{1}{2} \quad \frac{4}{3} \quad \frac{3}{2}a \quad \frac{3}{4}a \quad \pi \quad \frac{2}{5}a \quad \frac{2}{15} \quad 0 \quad a \quad \frac{1}{3}.b \quad \frac{4}{3} \quad \frac{3}{2}\frac{1}{3} \quad \frac{5}{6}$

09-10 A1

$1.\lim_{x \quad 0}\frac{1 \quad \cos x}{x^2} \quad 1/2$

$2.\lim_{x \quad 0} x^2 \sin\frac{1}{x} \quad 0 \quad f \; 0,$

$\lim_{x \quad 0} f' \; 0 \quad \lim_{x \quad 0}\frac{x^2\sin\frac{1}{x} \quad 0}{x} \quad \lim_{x \quad 0} x\sin\frac{1}{x} \quad 0 \quad f' \; 0$

$3.\lim_{x \quad 1} f \; x \quad \lim_{x \quad 1}\frac{x^2 \quad 1}{x \quad 1} \quad \lim_{x \quad 1} x \quad 1 \quad 2$

$\lim_{x \quad 1} f \; x \quad 2x \quad 2,$

$4.C$

$1.\lim_{x} \; 1 \quad \frac{1}{x}^{3x} \quad \lim_{x} \; 1 \quad \frac{1}{x}^{x \quad 3} \quad e^{\;3}$

$2.\lim_{x \quad 0}\frac{e^{3x\sin x} \quad 1}{\tan x^2} \quad \lim_{x \quad 0}\frac{2x\sin x}{\tan x^2} \quad 2$

$3.k \quad \lim_{x}\frac{y}{x} \quad \lim_{x}\frac{x}{3x \quad 1} \quad \frac{1}{3} \quad b \quad \lim_{x} \; y \quad kx \quad \lim_{x}\frac{3x}{9x \quad 3} \quad \frac{1}{3}$

$y \quad \frac{1}{3} \; x \quad 1$

$4.y' \quad 2\frac{\ln 1 \quad x}{1 \quad x}, \quad dy \quad 2\frac{\ln 1 \quad x}{x \quad 1}dx$

$5.y' \quad xe^{\frac{x^2}{2}} \quad 0 \quad x \quad 0 \quad y'' \quad e^{\frac{x^2}{2}} \quad x^2 e^{\frac{x^2}{2}} \quad 0 \quad x^2 \quad 1 \quad 0 \quad x \quad 1$

$6. \; xf'' \; x \; dx \quad xf' \; x \quad f' \; x \; dx \quad xf' \; x \quad f \; x \quad C$

$7. \int_0 e^{\;5x}dx \quad \frac{1}{5}e^{\;5x}\Big|_0 \quad \frac{1}{5}$

$8.\overline{y} \quad \frac{1}{\pi} \ {}_{0}^{\pi} \sin x dx \quad \frac{2}{\pi}$

$9. \ {}_{1}^{1} |x| \quad \sin x \ x^2 dx \quad 2 \ {}_{0}^{1} x^3 dx \quad \frac{1}{2}$

$10. \quad {}_{0}^{1} f \ x \ dx \quad A. f \ x \quad x \quad 2A \qquad 0,1 \qquad A \quad \frac{1}{2} \quad 2A \quad A \quad \frac{1}{2}$

$1. x' \quad 2t \quad 1, y' \quad \cos t \quad \frac{dy}{dx} \quad \frac{y'}{x'} \quad \frac{\cos t}{2t \quad 1}, \frac{d^2 y}{dx^2} \quad \frac{d \ \frac{dy}{dx}}{dt} \frac{dt}{dx} \quad \frac{\sin t \ 2t \quad 1 \quad 2\cos t}{2t \quad 1 \ ^3}$

$2. \sin xy \quad \ln y \quad x \quad x$

$\cos xy \ \ xdy \quad ydx \quad \frac{dy \quad dx}{y \quad x} \quad dx, \ 0,1$

$dx \quad dy \quad dx \quad dx \quad \frac{dy}{dx} \quad 1 \qquad y \quad x \quad 1$

$1. \lim_{x \ 0} \frac{e^x \quad 1 \quad 2x^{\frac{1}{2}}}{\ln 1 \quad x^2} \quad \lim_{x \ 0} \frac{e^x \quad e^{\frac{1}{2}\ln 1 \ 2x}}{x^2} \quad \lim_{x \ 0} \frac{e^x \ 1 \quad e^{\frac{1}{2}\ln 1 \ 2x \quad x}}{x^2} \quad \lim_{x \ 0} \frac{\frac{1}{2}\ln 1 \quad 2x \quad x}{x^2}$

$\frac{0}{0} \quad \lim_{x \ 0} \frac{\frac{1}{1 \ 2x} \quad 1}{2x} \quad \frac{1}{4}$

$2. n \frac{n}{n \quad n^2} \quad A \quad n \frac{1}{1 \quad n^2} \qquad A \quad 1$

$x \qquad x \quad {}_{0}^{x} f \ x \ dx \quad — x^2$

$x \qquad x \quad {}_{0}^{x} f \ x \ dx \quad {}_{0}^{3} f \ x \ dx \quad {}_{3}^{x} f \ x \ dx \quad \frac{3}{4} \quad {}_{3}^{x} 2 \quad \frac{x}{2} dx \quad 2x \quad 3 \quad \frac{1}{4} x^2$

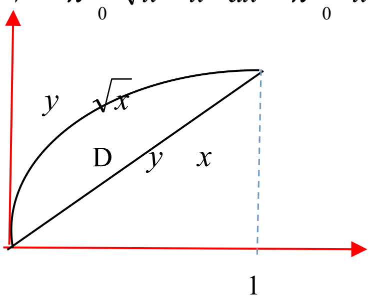
$\frac{dy}{dx}\sin x \quad y\ln y \qquad \frac{dy}{y\ln y} \quad \frac{dx}{\sin x} \qquad \ln\ln y \quad \ln\left|\csc x \quad \cot x\right| \quad \ln c$

$\ln y \quad c\ \csc x \quad \cot x \qquad y\ \pi/2 \quad e, \quad c \quad 1 \quad y \quad \csc x \quad \cot x$

2. $x^2 \quad 1\ y' \ 2xy \quad \cos x, \qquad x^2 \quad 1\ y^{'} \quad \cos x \qquad x^2 \quad 1\ y \quad \sin x \quad C$

$A \quad {}_0^1 \sqrt{x} \quad x\,dx \quad \frac{2}{3}x^{\frac{3}{2}} \quad \frac{1}{2}x^2 \ \Big|_0^1 \quad \frac{1}{6}$

$V \quad \pi\ {}_0^1 \sqrt{x} \quad x\ ^2 dx \quad \pi\ {}_0^1\ x \quad x^2 \quad x^{\frac{3}{2}}\ dx \quad \frac{13\pi}{25}$



2 . $F\ x \quad f\ x \quad \sin x \quad F\ 0 \quad f\ 0 \quad 0 \quad 0, F\ \pi/2 \quad f\ \pi/2 \quad 1 \quad 0$

, $\xi \quad 0, \frac{\pi}{2}$

$F'\ x \quad f'\ x \quad \cos x \quad 0 \quad f'\ x \quad \cos x$

10-11 A1

1. $\lim_{x \quad 0}\frac{\sqrt{1 \quad x} \quad \sqrt{1 \quad x}}{x} \quad \lim_{x \quad 0}\frac{1 \quad x \quad 1 \quad x}{x\sqrt{1 \quad x} \quad \sqrt{1 \quad x}} \quad \frac{2x}{2x} \quad 1$

2.D

3. $F\ x \quad e^x \quad x \quad 2 \quad F'\ x \quad e^x \quad 1 \quad 0 \quad x \quad 0 \quad F\ 0 \quad 1, F\ 1 \quad e \quad 2 \quad 0$

4. $f\ x$, $F\ x \quad G\ x \quad C$

1. $\lim_{x \quad 1} e^{\frac{1}{x \quad 1}} \quad e \quad 0$

2. $\lim_{x \quad 0}\frac{\sin 3x}{x\ 1 \quad \cos x} \quad \lim_{x \quad 0}\frac{3x}{2x} \quad \frac{3}{2}$

3. , $e^y dy \quad ydx \quad xdy \quad 0 \quad dy \quad \frac{y}{e^y \quad x} dx$

4. $\lim_{0} \quad \lim_{0} \quad ^{\frac{1}{2}} \quad \lim_{0} \frac{^{\frac{1}{2}} \; -.}{1} \quad \lim_{0} \frac{\frac{2}{3} e^{\frac{1}{2}}}{\frac{1}{x^2}} \quad \lim_{0} \frac{2e^{\frac{1}{2}}}{x}$

$x \quad 0$

1 1 . $dy \quad \frac{\arctan x}{1 \quad x^2} dx \quad y \quad \frac{1}{2} \arctan x^{\ 2} \quad C \quad y|_{x \ 0} \quad 1, \quad C \quad 1 \quad 2y \quad \arctan x^{\ 2} \quad 2$

2 $\quad , \quad \frac{dy}{dx} \quad \frac{1}{\sqrt{9 \quad x^2}} \quad y \quad \arcsin\frac{x}{3} \quad C$

$0,1 \quad C \quad 1. \quad y \quad \arcsin\frac{x}{3} \quad 1$

2. $\frac{xy' \ \ y}{x^2} \quad \cos x. \quad \frac{y}{x}^{'} \quad \cos x \quad \frac{y}{x} \quad \sin x \quad C$

$1 \quad x \quad 0. \quad x \quad \int_1^x 2x \quad \frac{3}{2}x^2 \quad x^2 \quad \frac{1}{2}x^3 \quad \frac{1}{2}$

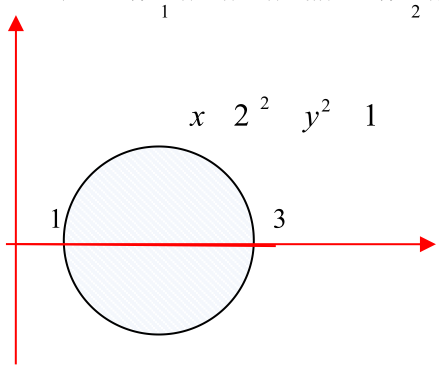
$0 \quad x \quad 1. \quad x \quad \int_1^0 2x \quad \frac{3}{2}x^2 dx \quad \int_0^x \frac{1}{1 \quad e^x} dx \quad \frac{1}{2} \quad \int_0^x \frac{1 \quad e^x \quad e^x}{1 \quad e^x} dx \quad \frac{1}{2} \quad x \quad \ln 1 \quad e^x$

$x \quad \begin{matrix} x^2 \quad \frac{1}{2}x^3 \quad \frac{1}{2}, \ 1 \quad x \quad 0 \\ \frac{1}{2} \quad x \quad \ln 1 \quad e^x, 0 \quad x \quad 1 \end{matrix}$

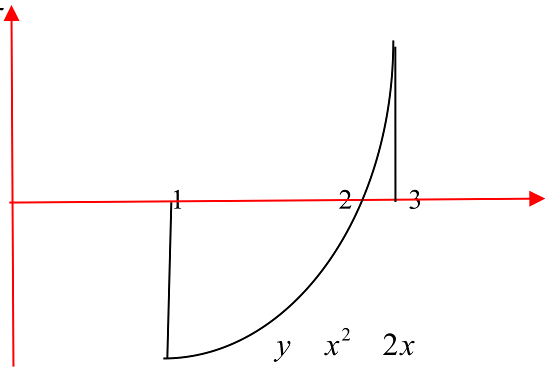
$1 \ V \quad 4\pi \int_1^3 x\sqrt{1 \quad x \quad 2^{\ 2}} dx^{\ x \ 2 \ \sin t} \quad 4\pi \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 2 \quad \sin t \ \cos^2 t dt \quad 4\pi \int_0^{\frac{\pi}{2}} 2\cos^2 t dt \quad 2\pi^2$

$2 \ A \quad \int_0^2 |y| dx \quad \int_0^2 2x \quad x^2 dx \quad \frac{4}{3}$

$2 \ V \quad 2\pi \int_1^2 x \ 2x \quad x^2 \ dx \quad 2\pi \int_2^3 x \ x^2 \quad 2x \ dx \quad 9\pi$



(1)



(2)

$1 \ 1 \quad \int_0^2 f \ x \ dx \quad \int_0^1 f \ x \quad f \ 0 \ dx \quad \int_1^2 f \ x \quad f \ 2 \ dx$

$\left|\int_0^2 f \ x \ dx\right| \quad \left|\int_0^1 f \ x \quad f \ 0 \ dx \quad \int_1^2 f \ x \quad f \ 2 \ dx\right| \quad \left|\int_0^1 f' \ \xi_1 \ xdx \quad \int_1^2 f' \ \xi_2 \quad x \quad 2 \ dx\right|$

$$\left|\int_0^1 f\ \xi_1\ xdx\right| \left|\int_1^2 f\ \xi_2\ \ 2\ \ x\,dx\right| \quad M\int_0^1 xdx \quad M\int_1^2 2\ \ x\,dx \quad \frac{1}{2}M \quad \frac{1}{2}M \quad M\ \xi_1 \quad 0,1\ ,\xi_2 \quad 1,2$$

$$\left|\int_0^2 f\ \ x\,dx\right| \quad M$$

2 p,q , , ξ_1

$f'\ \xi_1 \quad 0,\ \xi_1 \quad p,q$

, q,r , ξ_2, $f'\ \xi_2 \quad 0$

ξ_1,ξ_2 $\xi \quad \xi_1,\xi_2 \quad a,b$

$f''\ \xi \quad 0$

11-12 A1

1. --D

2. $\lim\limits_{x\ \ 0}\dfrac{f^2\ \ x \quad x \quad f^2\ \ x}{}$ ^{2} ' 2 '

7.0 , .

$8.dA \quad \frac{1}{2}\rho^2 \ \theta \ d\theta \qquad V \quad {}_c^d \pi\varphi^2 \ y \ dy$

$1.\lim_x \ \frac{2x \quad 1}{2x \quad 1}^{2x} \quad \lim_x \ 1 \quad \frac{2}{2x \quad 1}^{2x} \quad \lim_x \ 1 \quad \frac{2}{2x \quad 1}^{\frac{2x \ 1}{2}\frac{4x}{2x \ 1}} \quad e^{\frac{1}{2}}$

$2.n\frac{n}{n^2 \quad n\pi} \quad A \quad n\frac{n}{n^2 \quad \pi}$

, $A \quad 1$

$3.x' \quad 1 \quad \frac{1}{1 \quad t} \quad \frac{t}{1 \quad t}, y' \quad 3t^2 \quad 2t \quad \frac{dy}{dx} \quad \frac{y'}{x'} \quad \frac{3t^2 \quad 2t \ 1 \quad t}{t} \quad 3t \quad 2 \ 1 \quad t \quad 3t^2 \quad 5t \quad 2$

$\frac{d^2y}{dx^2} \quad \frac{d\frac{dy}{dx}}{dt}\frac{dt}{dx} \quad \frac{6t \quad 5 \ 1 \quad t}{t}$

$F \ x \quad 2x \quad \ln\frac{1 \quad x}{1 \quad x}$

$F' \ x \quad 2 \quad \frac{1}{1 \quad x} \quad \frac{1}{1 \quad x} \quad 2 \quad \frac{2}{1 \quad x^2} \quad \frac{x^2}{1 \quad x^2} \quad 0. \quad 0,1$

$F \ 0 \quad 0. \quad F \ 0 \quad 0 \quad 2x \quad \ln\frac{1 \quad x}{1 \quad x} \quad 0 \quad e^{2x} \quad \frac{1 \quad x}{1 \quad x}$

.

$1. \ \ln\sin x\csc^2 xdx \quad \ln\sin x\cot x \quad \cot^2 xdx \quad \ln\sin x\cot x \quad \csc^2 x \quad 1dx$

$\ln\sin x\cot x \quad \cot x \quad x \quad C$

$xe^{\ 2x}dx \quad \frac{1}{2}xe^{\ 2x} \quad \frac{1}{2} \quad e^{\ 2x}dx \quad \frac{1}{2}xe^{\ 2x} \quad \frac{1}{4}e^{\ 2x} \quad C$

$2. \ \frac{x \quad 2}{x^2 \quad 2x \quad 3}dx \quad \frac{1}{2} \quad \frac{2x \quad 2 \quad 6}{x^2 \quad 2x \quad 3}dx \quad \frac{1}{2} \quad \frac{d \ x^2 \quad 2x \quad 3}{x^2 \quad 2x \quad 3} \quad 3 \quad \frac{1}{x \quad 1^{\ 2} \quad 2}dx$

$\frac{1}{2}\ln x^2 \quad 2x \quad 3 \quad \frac{3}{\sqrt{2}}\arctan\frac{x \quad 1}{2} \quad C$

$3. \quad {}_0^1 f \ x \ dx \quad A \qquad 0,1 \qquad , \ A \quad {}_0^1\frac{1}{1 \quad x^2}dx \quad A \ {}_0^1\frac{1}{\sqrt{1 \quad x^2}}dx$

$A \quad \frac{\pi}{4} \quad \frac{\pi}{2}A \quad A \quad \frac{\pi}{4 \quad 2\pi}$

$1 \quad x \quad 3, F \ x \qquad {}^1 f \ t \ dt \quad {}_1^x f \ t \ dt \quad {}_1^x 1 \quad t^2 \ dt \quad t \quad \frac{1}{3}t^3 \ {}_1^x \quad x \quad \frac{1}{3}x^3 \quad \frac{2}{3}$

$x \quad 3, F \quad x \quad {}^{1} f \quad t \; dt \quad {}_{1}^{3} f \quad t \; dt \quad {}_{3}^{x} f \quad t \; dt \quad t \quad \frac{1}{3} t^{3} \Big|_{1}^{3} \quad \frac{16}{3}$

$$F \quad x \quad \begin{matrix} 0, x \quad -1 \\ x \quad \frac{1}{3}x^{3} \quad \frac{2}{3}, \; 1 \quad x \quad 3 \\ \frac{16}{3}, x \quad 3 \end{matrix} \quad \lim_{x \quad 3} F \quad x \quad 3 \quad \frac{1}{3}3^{3} \quad \frac{2}{3} \quad \frac{16}{3} \quad \lim_{x \quad 3} F \quad x \quad F \quad 3$$

$f \quad 3 \quad 0. f \quad 3 \quad 8 \quad \mathrm{F} \quad x \quad x \quad 3$

.

$7.4x^{2} \quad y^{2} \quad 4, 8x \quad 2yy' \quad 0 \quad y' \quad \frac{4x}{y} \qquad Y \quad y \quad \frac{4x}{y} \quad X \quad x$

$X \quad 0, \quad Y \quad \frac{4}{y}.Y \quad 0. \quad X \quad \frac{1}{x}$

$S \quad \frac{1}{2}XY \quad \frac{1}{4}2\pi \quad \frac{2}{xy} \quad \frac{\pi}{2} \quad \frac{2}{x\sqrt{4 \quad 4x^{2}}} \quad \frac{\pi}{2} \quad \frac{1}{x\sqrt{1 \quad x^{2}}} \quad \frac{\pi}{2}$

$.f\ c \quad f\ a \quad f\ b \quad , \quad c,b \qquad \xi.$

$f'\ \xi \quad \frac{f\ b \quad f\ c}{b \quad c} \quad 0$

$\xi \quad a,b \quad f'\ \xi \quad 0$

12-13 A1

1. $\lim_{x\ 0}\frac{1}{x}$ $,\lim_{x\ 0}\frac{1}{x}$ $\lim_{x\ 0}\frac{1}{x}$ D

2. $\lim_{x} y \quad \lim_{x}\frac{1 \quad e^{2x^2}}{1 \quad e^{x^2}} \quad 1$ $\quad y \quad 1$

$\lim_{x\ 0}\frac{1 \quad e^{x^2}}{1 \quad e^{x^2}} \quad \frac{2}{0}$ $\quad x \quad 0$

3. D

4. $f'\ \sin^2 x \quad 1 \quad \cos^2 x \quad f'\ x \quad 1 \quad x$

$f\ x \quad x \quad \frac{1}{2}x^2 \quad C$

1. $\lim_{x}\ \frac{x \quad 1}{x}^{2x} \quad \lim_{x}\ 1 \quad \frac{1}{x}^{\ x \quad 2} \quad e^{\ 2}$

2. $y' \quad \frac{1}{x}.y'' \quad \frac{1}{x^2}.y''' \quad 1^{\ 2}\frac{2}{x^3}....y^{\ n} \quad 1^{\ n\ 1}\frac{n \quad 1!}{x^n}$

3. $,xdy \quad ydx \quad e^{x\ y}\ dx \quad dy$

$xdy \quad ydx \quad xy\ dx \quad dy \quad dy \quad \frac{xy \quad y}{x \quad xy}dx$

4. $y' \quad e^{\ x} \quad xe^{\ x}.y'' \quad e^{\ x} \quad xe^{\ x} \quad e^{\ x} \quad 2 \quad x\ e^{\ x} \quad 0 \quad x \quad 2$

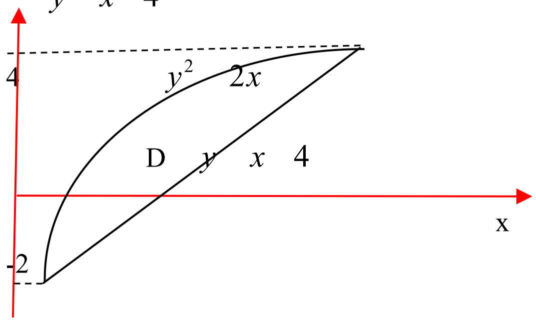
$x \quad 0 \quad .y'' \quad . \quad 2,2e^{\ 2}$

5. $\frac{d}{dx}\int_0^{x^2} \ln 1 \quad t\ dt \quad 2x\ln 1 \quad x^2$

6. $\int_e \frac{dx}{x\ln^2 x} \quad \int_e \frac{d\ \ln x}{\ln^2 x} \quad \frac{1}{\ln x}\Big|_e \quad 1$

7. $\rho\ x_0 \quad \lim_{x\ x_0}\frac{m\ x \quad m\ x_0}{x \quad x_0} \quad m\ x\ '\Big|_{x\ x_0} \quad m'\ x_0$

8. $\begin{matrix} y^2 \quad 2x \\ y \quad x \quad 4 \end{matrix}$ $\quad 2,\ 2 . 8,4 \quad dA \quad y \quad 4 \quad \frac{y^2}{2} \; dy$



$$1.\lim_{x \quad 0}\frac{\sin 4x \quad x^2\sin\frac{1}{x}}{1 \quad \cos x \; x} \quad \lim_{x \quad 0}\frac{\sin 4x}{2x} \quad 2$$

$$2.\lim_{x \quad 0}\frac{x \quad \arcsin x}{x^3} \; {}^{\arcsin x \quad t} \quad \lim_{t \quad 0}\frac{\sin t \quad t}{\sin^3 t} \; \frac{0}{0}. \quad \lim_{x \quad 0}\frac{\cos t \quad 1}{3t^2} \quad \lim_{x \quad 0}\frac{\frac{1}{2}t^2}{3t^2} \quad \frac{1}{6}$$

$$3.y \quad e^{x^2\ln\frac{x \quad 2}{1 \quad x}}.y' \quad e^{x^2\ln\frac{x \quad 2}{1 \quad x}} \quad 2x\ln\frac{x \quad 2}{1 \quad x} \quad x^2 \quad \frac{1}{x \quad 2} \quad \frac{1}{1 \quad x} \qquad \frac{2 \quad x}{1 \quad x}^{x^2} \quad 2x\ln\frac{2 \quad x}{1 \quad x} \quad \frac{3x^2}{2 \quad x \quad 1 \quad x}$$

$$4.x' \quad 2t \quad \cos t \quad t\sin t \quad \cos t \quad t \; 2 \quad \sin t \; .y' \quad 2 \quad \sin t$$

$$\frac{dy}{dx} \quad \frac{y'}{x'} \quad \frac{1}{t}, \frac{d^2y}{dx^2} \quad \frac{d\;\frac{dy}{dx}}{dt} \; \frac{dt}{dx} \qquad \frac{1}{2t^2 \; 2 \quad \sin t}$$

$$1. \quad \frac{x \quad 1}{x\sqrt{x \quad 2}}dx \qquad \frac{1}{\sqrt{x \quad 2}}dx \qquad \frac{dx}{x\sqrt{x \quad 2}} \quad 2\sqrt{x \quad 2} \qquad \frac{dx}{x \quad 2 \quad 2\;\sqrt{x \quad 2}}$$

$$2\sqrt{x \quad 2} \quad 2 \; \frac{d\;\sqrt{x \quad 2}}{2 \quad \sqrt{x \quad 2}^{\;2}} \quad 2\sqrt{x \quad 2} \quad \sqrt{2}\arctan\frac{\sqrt{x \quad 2}}{2} \quad C$$

$$2 \;{}_{0}^{\frac{1}{2}} x\arcsin x dx \quad \frac{\arcsin x \quad u, x \quad 0, u \quad 0, x \quad \frac{1}{2}, u \quad \frac{\pi}{6}}{dx \quad \text{cosudu}} \qquad {}_{0}^{\frac{\pi}{6}} u\sin u\cos u du \quad \frac{1}{2} \;{}_{0}^{\frac{\pi}{6}} u\sin 2u du$$

$$\frac{1}{4}u\cos 2u \quad \frac{1}{8}\sin 2\text{u} \;\Big|_{0}^{\frac{\pi}{6}} \quad \frac{3\sqrt{3} \quad \pi}{48}$$

$$0 \quad x \quad 1. \quad x \qquad {}_{0}^{x} f \; t \; dt \qquad {}_{0}^{x} e^t dt \quad e^x \quad 1$$

$$x \quad 1. \quad x \qquad {}_{0}^{x} f \; t \; dt \qquad {}_{0}^{1} e^x dx \qquad {}_{1}^{x} \frac{1}{x}dx \quad e \quad 1 \quad \ln x$$

$$x \quad \begin{matrix} e \quad 1 \quad \ln x, x \quad 1 \\ e^x \quad 1.0 \quad x \quad 1 \end{matrix}$$

$\lim_{x\to 1} x \quad e \quad 1. \lim_{x\to 1} x \quad e \quad 1 \qquad 1$

$\lim_{x\to 1} f\ x \quad 1. \lim_{x\to 1} f\ x \quad 1$

$x \quad x \quad 1$

$$V \quad \pi \int_0^{2\pi} y^2\ t\ dx \quad 8\pi \int_0^{2\pi} 1 \quad \cos t\ ^3 dt \quad 8\pi \int_0^{2\pi} 2\sin^2 \frac{t}{2}\ ^3 dt \quad 2^6 \pi \int_0^{2\pi} \sin^6 \frac{t}{2} dt$$

$$^{2u\ \ t}\ 2^6 \pi \int_0^{\pi} \sin^6 udu \quad 2^7 \pi \int_0^{\frac{\pi}{2}} \sin^6 udu \quad \frac{5}{6}\frac{3}{4}\frac{1}{2}\frac{\pi}{2} 2^7 \pi \quad 20\pi^2$$

.

$F\ t \quad f\ t \quad t$

$F\ 0 \quad f\ 0 \quad 0. F\ 1 \quad f\ 1 \quad 1 \quad 0$

$F\ 0\ F\ 1 \quad 0. \quad F\ t \quad 0,1 \qquad x. \quad F\ x \quad 0 \quad f\ x \quad x$

$F'\ t \quad f'\ t \quad 1 \quad 0$

$f\ x \quad x$

$, \frac{1}{b \quad a} \int_a^b f\ x\ dx \quad f\ c \quad f\ b . c \quad a, b$

b, c , $\xi \quad c, b \quad a, b$

$f'\ \xi \quad 0$

13-14 A1

$1. \lim_{x \to 0} \sin x \sin \frac{1}{x} \quad 0.$

2. D

$3. p \quad 0. \int_0^1 \frac{1}{x} dx$

$p \quad 2. \int_0^1 \frac{dx}{x^{1\ \ p}} dx \quad \int_0^1 xdx \quad \frac{1}{2} \qquad D$

4.0 ,

$$1.\lim_{x\ \ 0}\frac{\cos x\quad 1}{1\quad x^{2}\ \frac{1}{3}\quad 1}\quad \lim_{x\ \ 0}\frac{\frac{1}{2}x^{2}}{\frac{1}{3}x^{2}}\qquad \frac{3}{2}$$

$$2.y'\quad \frac{1}{x}\quad 2\quad x\quad {}^{1}\!/_{2}\qquad {}^{1}\!/_{2},\ \ln 2\qquad\qquad y\quad 2x\quad 3$$

$$3.\qquad\qquad ,\ \sin xdy\quad y\cos xdx\quad \sin\ x\quad y\ \ dx\quad dy\quad 0$$

$$dy\quad \frac{y\cos x\quad \sin\ x\quad y}{\sin\ x\quad y\quad \sin x}dx$$

$$4.\ \ e^{1\ \ \sin^{2}x}\sin 2xdx\qquad e^{1\ \ \sin^{2}x}d\ 1\quad \sin^{2}x\qquad e^{1\ \ \sin^{2}x}\quad C$$

$$5.F\ \ x\qquad {}_{0}^{x}f\ \ t\ \ dt\qquad {}_{0}^{3}1\quad x^{2}\ \ dx\qquad {}_{3}^{x}0dx\quad x\quad \frac{1}{3}x^{3}\Big|_{0}^{3}\qquad 6$$

$$6.V\quad \pi\ {}_{a}^{b}\ f\ \ x\quad g\ \ x\ \ {}^{2}dx$$

$$1.\lim_{x}\ 1\quad \frac{1}{x^{2}}^{\ 3x}\qquad \lim_{x}e^{3x\ln\ 1\ \ \frac{1}{x^{2}}}\qquad \lim_{x}e^{\ 3x\ \ \frac{1}{x^{2}}}\quad e^{0}\quad 1$$

$$2.x'\quad e^{t}\sin t\quad e^{t}\cos t, y'\quad e^{t}\ \sin t\quad \cos t\quad \frac{dy}{dx}\quad \frac{y'}{x'}\quad \frac{\sin t\quad \cos t}{\cos t\quad \sin t}$$

$$\frac{d^{2}y}{dx^{2}}\quad \frac{d\ \frac{dy}{dx}}{dt}\frac{dt}{dx}\quad \frac{\sin t\quad \cos t\ ^{2}\quad \sin t\quad \cos t\ ^{2}}{\cos t\quad \sin t\ ^{2}}\frac{1}{e^{t}\ \cos t\quad \sin t}\quad \frac{2}{e^{t}\ \cos t\quad \sin t\ ^{3}}$$

$$3.\lim_{x}\frac{{}_{1}^{x}\ t^{2}\ \ e^{\frac{1}{t}}\quad 1\quad t}{x}\ \ \frac{}{}.\qquad \lim_{x}x^{2}\ \ e^{\frac{1}{x}}\quad 1\quad x\quad {}^{u\ \ \frac{1}{x}}\ \lim_{u\ \ 0}\frac{e^{u}\quad 1\quad u}{u^{2}}\ \frac{0}{0}.\quad \lim_{u\ \ 0}\frac{e^{u}\quad 1}{2u}\quad \frac{1}{2}$$

$$1.\ {}_{0}^{\frac{\pi^{2}}{4}}\sin\sqrt{x}dx\ \ {}^{\sqrt{x}\ \ t}\ \ 2\ {}_{0}^{\frac{\pi}{2}}t\sin tdt\qquad 2t\cos t\Big|_{0}^{\frac{\pi}{2}}\quad 2\ {}_{0}^{\frac{\pi}{2}}\sin tdt\quad \pi\quad 2$$

$$\ln f\ \ x\quad 3\ln 1\quad x\quad 2\ln\ x\quad 1$$

$$\frac{f'\ x}{f\ \ x}\quad \frac{3}{1\quad x}\quad \frac{2}{x\quad 1}\quad \frac{x\quad 5}{x^{2}\quad 1}\qquad f'\ x\qquad \frac{x\quad 1\ ^{2}}{x\quad 1\ ^{2}}\frac{x\quad 5}{x\quad 1}\quad 0\quad 1\quad x\quad 5$$

$$f'\ x\quad 0\quad x\quad 5\quad x\quad 1.f\quad x\quad f\ 5$$

$$\ln f'\ x\quad 2\ln 1\quad x\quad \ln\ x\quad 5\quad 3\ln\ x\quad 1$$

$$\frac{f''\ x}{f'\ x}\quad \frac{2}{1\quad x}\quad \frac{1}{x\quad 5}\quad \frac{3}{x\quad 1}\quad \frac{24}{x\quad 1\ \ x\quad 5\ \ x\quad 1}\qquad f''\ x\qquad \frac{24}{x\quad 1\ \ x\quad 5\ \ x\quad 1}\frac{x\quad 1\ ^{2}\ x\quad 5}{x\quad 1\ ^{3}}$$

$$\frac{24\ x\quad 1}{x\quad 1\ ^{4}}\quad 0\quad x\quad 1.f\quad 1$$

x	(- ,-1)	-1	(-1,1)	1	(1,5)	5	(5,+)

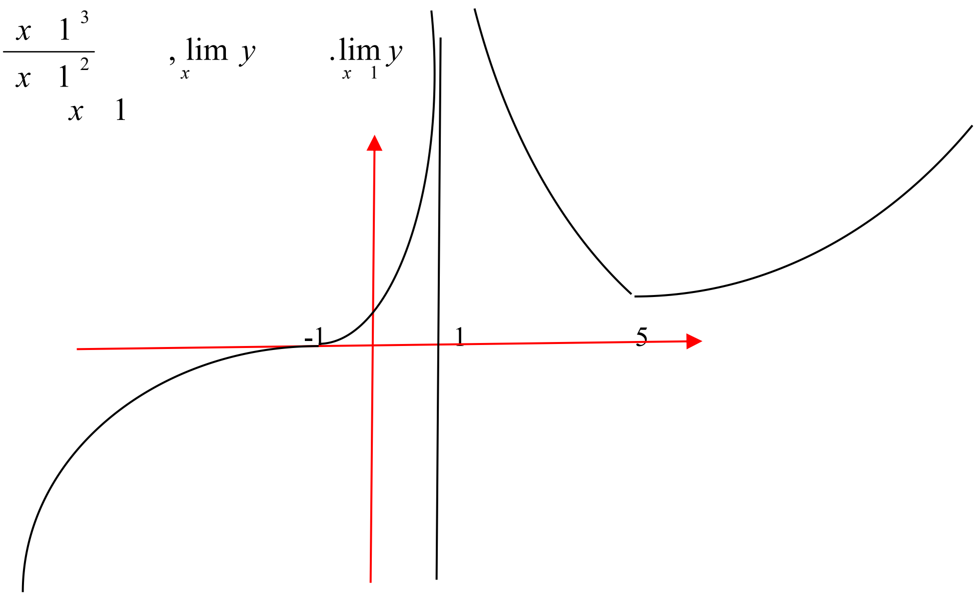
$k \quad \lim_{x} \frac{y}{x} \quad \lim_{x} \frac{x \quad 1^{3}}{x \quad 1^{2} x} \quad 1. b \quad \lim_{x} y \quad kx \quad \lim_{x} \frac{x \quad 1^{3} \quad x\, x \quad 1^{2}}{x \quad 1^{2}}$

$\lim_{x} \frac{x^3 \quad 3x \quad 3x^2 \quad 1 \quad x^3 \quad 2x^2 \quad x}{x \quad 1^{2}} \quad 5$

$y \quad x \quad 5. f \quad 1 \quad 0. f\ 5 \quad \frac{6^3}{4^2}$

$\lim_{x} y \quad \lim_{x} \frac{x \quad 1^{3}}{x \quad 1^{2}} \quad , \lim_{x} y \quad . \lim_{x \quad 1} y$

$x \quad 1$



$x' \quad \sin t \quad \sin t \quad t\cos t \quad t\cos t, y' \quad \cos t \quad \cos t \quad t \sin t$

$s \quad {}_{0}^{2\pi} ds \quad {}_{0}^{2\pi} \sqrt{x'^{\,2} \quad y'^{\,2}}\, dt \quad {}_{0}^{2\pi} t dt \quad 2\pi^2$

2. $\frac{2x \quad 3}{x^2 \quad 2x \quad 5} dx \quad \frac{2x \quad 2 \quad 1}{x^2 \quad 2x \quad 5} dx \quad \frac{d\ x^2 \quad 2x \quad 5}{x^2 \quad 2x \quad 5} \quad \frac{dx}{x \quad 1^{2} \quad 4}$

$\ln x^2 \quad 2x \quad 5 \quad \frac{1}{2} \arctan \frac{x \quad 1}{2} \quad C$

$f \quad x \qquad c, d \qquad . \qquad M, \qquad m$

$m \quad f \quad c \quad M \quad \alpha m \quad \alpha f \quad c \quad \alpha M$

$m \quad f \; d \quad M \quad \beta m \quad \beta f \; c \quad \beta M$

$, \quad m \quad \alpha f \; c \quad \beta f \; d \quad M$

$, \qquad \xi \quad c, d$

$\alpha f \; c \quad \beta f \; d \quad f \; \xi$

$$F \; x \quad \frac{1}{a} \, {}_0^a f \; x \, dx \quad {}_0^1 f \; x \, dx \quad \frac{1}{a} \, {}_0^a f \; x \, dx \quad {}_0^a f \; x \, dx \quad {}_a^1 f \; x \, dx$$

$$F \; x \quad f \; \xi_1 \quad af \; \xi_1 \quad 1 \quad a \; f \; \xi_2 \quad \xi_1 \quad 0, a \; , \xi_2 \quad a, 1$$

$$F \; x \quad f \; \xi_1 \quad f \; \xi_2 \quad a \; f \; \xi_2 \quad f \; \xi_1 \quad a \quad 1 \; f \; \xi_2 \quad f \; \xi_1$$

$f \; x \qquad \xi_1 \quad \xi_2, f \; \xi_2 \quad f \; \xi_1 \quad 0 \quad a \quad 1 \quad 0$

$$F \; x \quad 0 \quad \frac{1}{a} \, {}_0^a f \; x \, dx \quad {}_0^1 f \; x \, dx$$