

Has Olmayer Integraller

1. Tip) $\int_a^\infty f(x) dx, \int_{-\infty}^a f(x) dx, \int_{-\infty}^\infty f(x) dx$

$$\int_1^\infty \frac{dx}{x^2} = ? \quad \lim_{t \rightarrow \infty} \int_1^t \frac{dx}{x^2} = \lim_{t \rightarrow \infty} -\frac{1}{x} \Big|_1^t$$
$$= \lim_{t \rightarrow \infty} -\frac{1}{t} + \frac{1}{1} = 1$$

$$\int_{-\infty}^\infty \frac{dx}{1+x^2} = ?$$

$$\lim_{t \rightarrow \infty} \int_{-t}^t \frac{dx}{1+x^2} = \lim_{t \rightarrow \infty} \arctan x \Big|_{-t}^t$$

$$= \lim_{t \rightarrow \infty} \arctan(t) - \arctan(-t)$$
$$= \frac{\pi}{2} - \left(-\frac{\pi}{2}\right) = \pi$$

$$\int_4^\infty \frac{dx}{\sqrt{x}} = ? \quad \lim_{t \rightarrow \infty} \int_4^t \frac{dx}{\sqrt{x}}$$

$$= \lim_{t \rightarrow \infty} 2\sqrt{x} \Big|_4^t = \lim_{t \rightarrow \infty} 2\sqrt{t} - 4 = \infty$$

iraksak

2. Tip Has olmayan integral

$\int_{-2}^2 \frac{dx}{x^3} = ?$ ~~1. Tip~~

$\frac{1}{x^3} \rightarrow$ sınırlı

$$\int_0^2 \frac{dx}{x^3} = \lim_{t \rightarrow 0^+} \int_t^2 \frac{dx}{x^3}$$

$$= \lim_{t \rightarrow 0^+} \left. -\frac{1}{2x^2} \right|_t^2 = \lim_{t \rightarrow 0^+} +\frac{1}{2t^2} - \frac{1}{8} = \infty$$

ıraksak

ör: $\int_{-2}^2 \frac{dx}{\sqrt{4-x^2}} = \arcsin\left(\frac{x}{2}\right) \Big|_{-2}^2$

$$= \arcsin(1) - \arcsin(-1)$$

$$= \pi/2 - (-\pi/2) = \pi$$

3. Tip: Hem 1.tip, hem 2.tip ise III. tiptir.

keyfi $\int_0^\infty \frac{dx}{x^2} = ?$

1.tip $\int_1^\infty \frac{dx}{x^2}$

2.tip $\int_0^1 \frac{dx}{x^2}$

3.tip $\int_0^\infty \frac{dx}{x^2}$

$$\int_0^\infty \frac{dx}{x^2} = \int_0^1 \frac{dx}{x^2} + \int_1^\infty \frac{dx}{x^2} = 1$$

$$\lim_{t \rightarrow 0^+} \int_t^1 \frac{dx}{x^2}$$

$$= \lim_{t \rightarrow 0^+} \left. -\frac{1}{x} \right|_t^1 = \infty$$

ıraksak

$$\int_0^{\pi/2} \frac{\cos x dx}{1-2\sin x} = ? \quad \frac{1}{2} \ln |2\sin x - 1|$$

$\pi/6$ (circled) \rightarrow $\frac{1}{2} \ln |2\sin \pi/6 - 1| - \frac{1}{2} \ln 1$
 $\underbrace{\hspace{10em}}_{0}$
 $-\infty$ iraksak

$$\int_0^{\infty} \frac{dx}{\sqrt{x}} = \underbrace{\int_0^{2020} \frac{dx}{\sqrt{x}}}_{2\sqrt{x} \Big|_0^{2020} = 2\sqrt{2020}} + \underbrace{\int_{2020}^{\infty} \frac{dx}{\sqrt{x}}}_{\text{iraksak} \checkmark}$$

Analitik düzlemde, $x = 4y - y^2$ eğrisi ile y eksenini arasında kalan bölgenin alanı kaç br^2 dir?

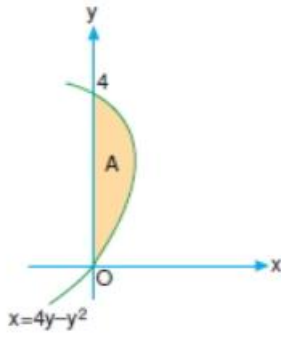
A) $\frac{32}{3}$

B) 12

C) $\frac{38}{3}$

D) $\frac{40}{3}$

E) 16



$$A = \int_0^4 f(y) dy = \int_0^4 (4y - y^2) dy$$

$$= \left(\frac{4y^2}{2} - \frac{y^3}{3} \right) \Big|_0^4$$

$$= \left(2 \cdot 16 - \frac{64}{3} \right) = \frac{32}{3} \text{ br}^2 \text{ bulunur.}$$

$$\int_3^5 f(x) dx = 12$$

$$du = 2 dx$$

olduğuna göre, $\int_1^2 f(2x+1) dx$ integralinin değeri kaçtır?

$$= \int_3^5 f(u) \frac{du}{2} = \frac{1}{2} \cdot 12 = 6$$

$$\int_0^3 x^{[x]} dx = \int_0^1 x^0 dx + \int_1^2 x^1 dx + \int_2^3 x^2 dx$$

integralinin değeri aşağıdakilerden hangisidir?

A) $\frac{53}{6}$

B) $\frac{43}{6}$

C) $\frac{43}{3}$

D) $\frac{38}{3}$

$$= 1 + \frac{3}{2} + \frac{19}{3}$$

$$= \frac{6 + 9 + 38}{6}$$

$$\frac{d}{dx} \int_2^{3x} t^2 dt$$

$$(3x)^2 \cdot 3 - 2^2 \cdot 0$$

ifadesinin eđiti nedir?

$$\lim_{x \rightarrow 2} \frac{\int_4^{x^2} (t^2 - t + 1) dt}{x - 2}$$

$$\frac{0}{0} = \lim_{x \rightarrow 2} \frac{((x^2)^2 - x^2 + 1)2x - 0}{1} = (16 - 4 + 1) \cdot 4 = \frac{52}{1}$$

limitinin deęeri kaętır?

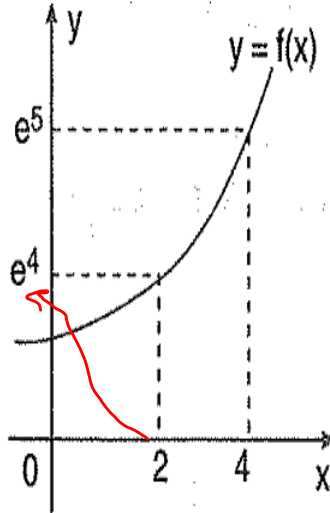
$y = f(x)$ fonksiyonunun grafięi
şekilde verilmiřtir.

Buna göre, $\int_2^4 \frac{f'(x) dx}{f(x)}$

integralinin deęeri kaętır?

$$\ln(f(x))$$

$$-\ln f(2) + \ln f(4) = 5 - 4 = 1$$



$$y = x^2 - 8x + 16 = (x - 4)^2$$

parabolünün eksenler ile sınırladıęı bölgenin alanı
kaę birimkaredir?

$$\int_0^4 (x - 4)^2 dx$$

$$= \frac{(x - 4)^3}{3} \Big|_0^4$$

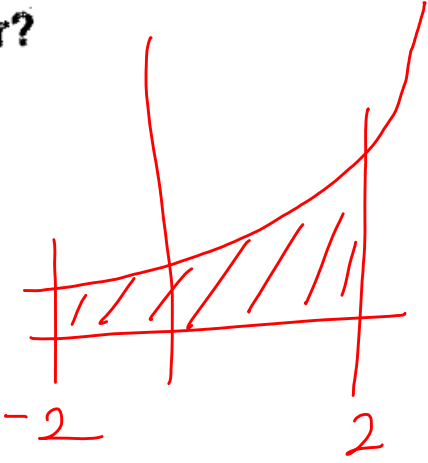
$$= \frac{64}{3} \checkmark$$



$$(x - 4)^2 = 0 \rightarrow x = 4$$

$y = e^x$ eğrisi ile $y = 0$, $x = -2$ ve $x = 2$

doğrularının sınırladığı bölgenin alanı kaç birimkaredir?



$$\int_{-2}^2 e^x dx = e^2 - e^{-2}$$