1) Agar $f(x) = 3x^2 - 4x + \int_1^3 f(t)dt$ bo'lsa, $f(1)$ ning qiymatini toping.

A) -11 B) -10 C) -9 D) -8

$= C$

$f(x) = 3x^2 - 4x + C$

$f(t) = 3t^2 - 4t + C$

$$\int_1^3 f(t)\,dt = t^3 - 2t^2 + Ct \Big|_1^3 = 27 - 18 + 3C - (1 - 2 + C)$$

$$= 10 + 2C$$

$10 + 2C = C$

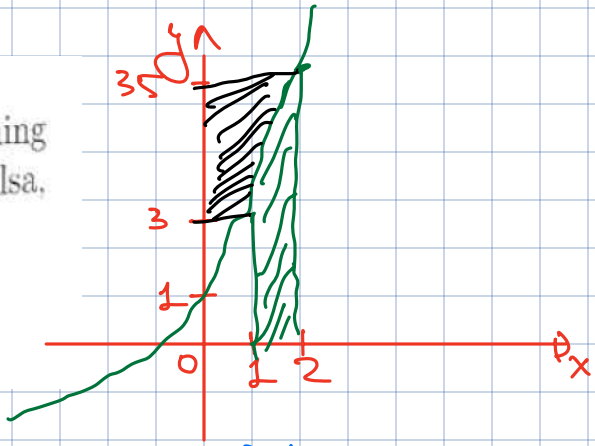
$C = -10$

$f(x) = 3x^2 - 4x - 10$

$f(1) = 3 - 4 - 10 = -11.$

2) Agar $f(x) = x^5 + x + 1$ funksiyaning teskari funksiyasi $g(x)$ bo'lsa, $\int_3^{35} g(x)dx$ ni hisoblang.

A)50 B)54 C)57 D)67



$$\int_3^{35} g(x)\,dx + \int_1^2 f(x)\,dx = 35 \cdot 2 - 3 \cdot 1$$

$$\int_1^2 (x^5 + x + 1)\,dx = \frac{x^6}{6} + \frac{x^2}{2} + x \Big|_1^2 = \frac{64}{6} + \frac{4}{2} + 2 - \left(\frac{1}{6} + \frac{1}{2} + 1\right)$$

$$= \frac{63}{6} + \frac{3}{2} + 1 = \frac{21}{2} + \frac{3}{2} + 1 = 13.$$

$$\int_3^{35} g(x)\,dx = 67 - 13 = 54.$$

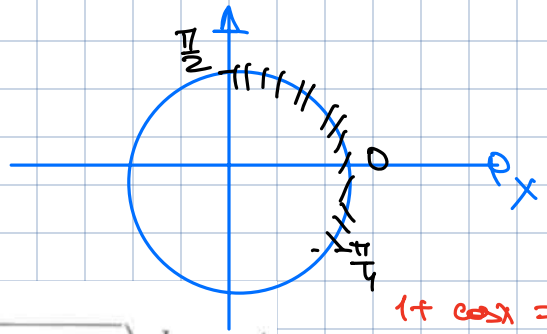
3) $\int_0^3 \frac{x}{\sqrt{x+1}}dx$ ni hisoblang.

A) 2 B) $\frac{7}{3}$ C) $\frac{8}{3}$ D) $\frac{10}{3}$

$$\int \frac{x+1-1}{\sqrt{x+1}}\,dx = \int \frac{x+1}{\sqrt{x+1}} - \frac{1}{\sqrt{x+1}}\,dx$$

$$= \int (x+1)^{\frac{1}{2}} - (x+1)^{-\frac{1}{2}}\,dx = \frac{2}{3}(x+1)^{\frac{3}{2}} - 2\cdot(x+1)^{\frac{1}{2}}\Big|_0^3$$

$$= \frac{2}{3}\cdot 8 - 2\cdot 2 - \left(\frac{2}{3} - 2\right) = \frac{8}{3}.$$



$-\frac{\pi}{2} \le x \le \pi$

$-\frac{\pi}{4} \le \frac{x}{2} \le \frac{\pi}{2}$

4) $\int_{-\frac{\pi}{2}}^{\pi} \left(\sqrt{1+\cos x} - \sqrt{1-\cos x}\right)dx$ ni hisoblang.

A) $4\sqrt{2}$ B) $4-2\sqrt{2}$ C) $-2+2\sqrt{2}$ D) $-4\sqrt{2}$

$1+\cos x = 2\cos^2\frac{x}{2}$

$1-\cos x = 2\sin^2\frac{x}{2}$.

$$\int_{-\frac{\pi}{2}}^{\pi} \left|\sqrt{2}\cos\frac{x}{2}\right| - \left|\sqrt{2}\sin\frac{x}{2}\right|dx$$

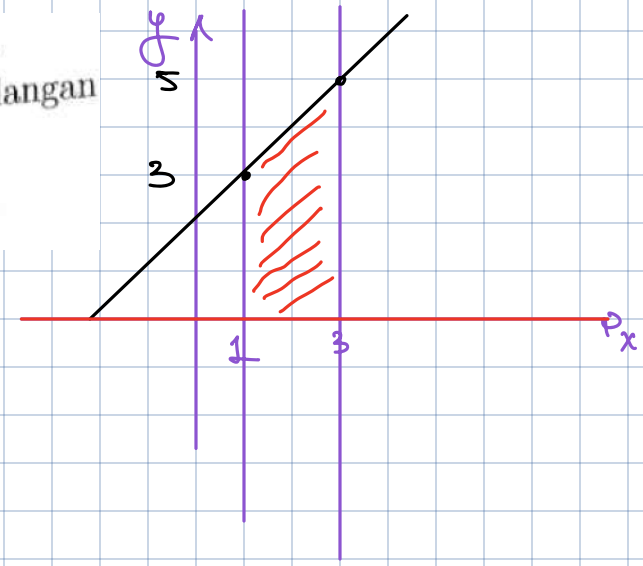
$$= \int_{-\frac{\pi}{2}}^{\pi} \sqrt{2}\cos\frac{x}{2}\,dx + \int_{-\frac{\pi}{2}}^{0} \sqrt{2}\sin\frac{x}{2}\,dx + \int_{0}^{\pi} \sqrt{2}\sin\frac{x}{2}\,dx$$

$$= 2\sqrt{2}\sin\frac{x}{2}\Big|_{-\frac{\pi}{2}}^{\pi} - 2\sqrt{2}\cos\frac{x}{2}\Big|_{-\frac{\pi}{2}}^{0} + 2\sqrt{2}\cos\frac{x}{2}\Big|_{0}^{\pi}$$

$$= 2\sqrt{2} + 2\sqrt{2}\cdot\frac{1}{\sqrt{2}} - 2\sqrt{2} + 2\sqrt{2}\cdot\frac{1}{\sqrt{2}} + 0 - 2\sqrt{2} = 4-2\sqrt{2}.$$

5) $y = x + 2; y = 0; x = 1$ va $x = 3$ to'g'ri chiziqlar bilan chegaralangan soha yuzini toping.

A)2 B)4 C)6 D)8



$$S = \int_1^3 (x+2)\,dx$$

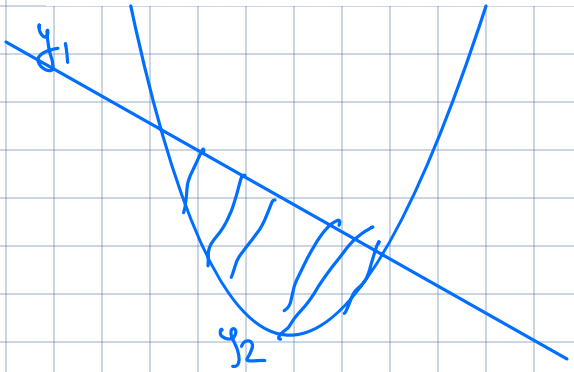
6) $y = x^2 - 2x; y = 2 - x$ chiziqlar bilan chegaralangan soha yuzini toping.

A)$\frac{3}{2}$ B)3 C)$\frac{9}{2}$ D)$\frac{21}{2}$

$x^2 - 2x = 2 - x$

$x^2 - x - 2 = 0$

$x_1 = 2 \quad x_2 = -1$



$$S = \int_{-1}^{2} (y_1 - y_2)\,dx = \int_{-1}^{2} 2 - x - (x^2 - 2x)\,dx$$

$$= \int_{-1}^{2} (2 + x - x^2)\,dx = \dots$$

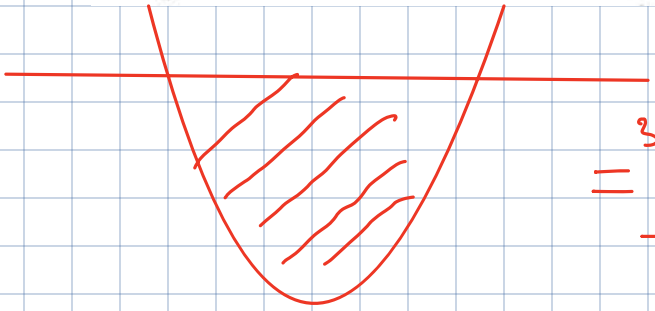
7) $y = x^2 - 2x$ va $y=3$ chiziqlar bilan chegaralangan soha yuzi nechaga teng?

A) $\frac{32}{3}$ B) $\frac{31}{3}$ C)10 D)11

$x^2-2x=3$

$x^2-2x-3=0$

$x_1=3 \quad x_2=-1$



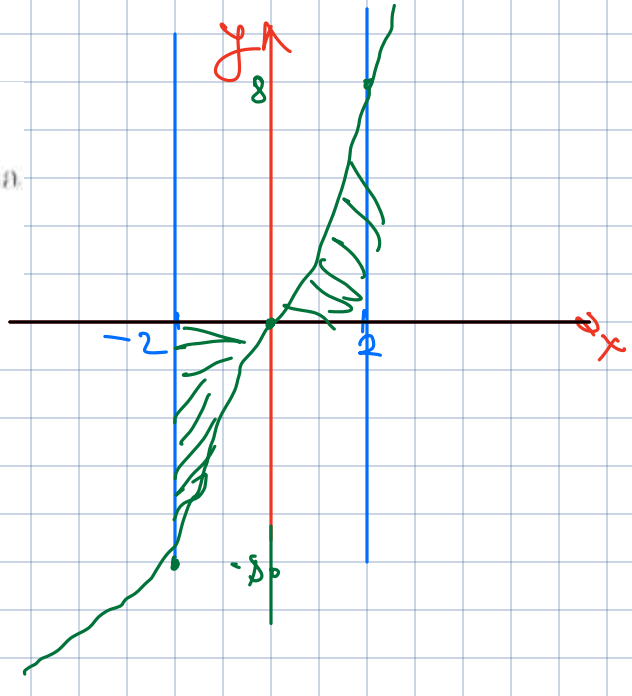
$$S=\int_{-1}^{3} 3-(x^2-2x)\,dx$$

$$=\int_{-1}^{3} (3-x^2+2x)\,dx = \dots$$

$$\int_{-2}^{2} x^3\,dx = ?$$

8) $y = x^3; y = 0; x = -2$ va $x = 2$ chiziqlar bilan chegaralangan soha yuzini toping.

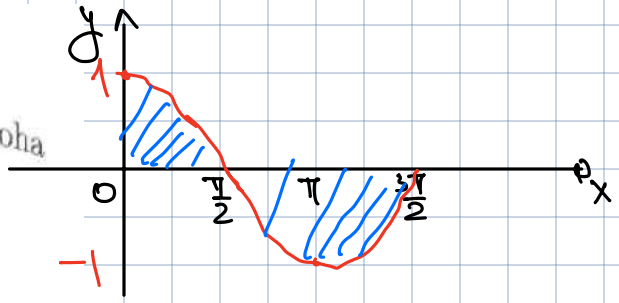
A)0 B)2 C)4 D)8



$$S=\int_{-2}^{0} -x^3\,dx + \int_{0}^{2} x^3\,dx = \dots$$

9) $y = \cos x; x = 0; x = \frac{3\pi}{2}; y = 0$ chiziqlar bilan chegaralangan soha yuzini toping.

A)2 B)3 C)π D)$\frac{\pi}{2} + 1$

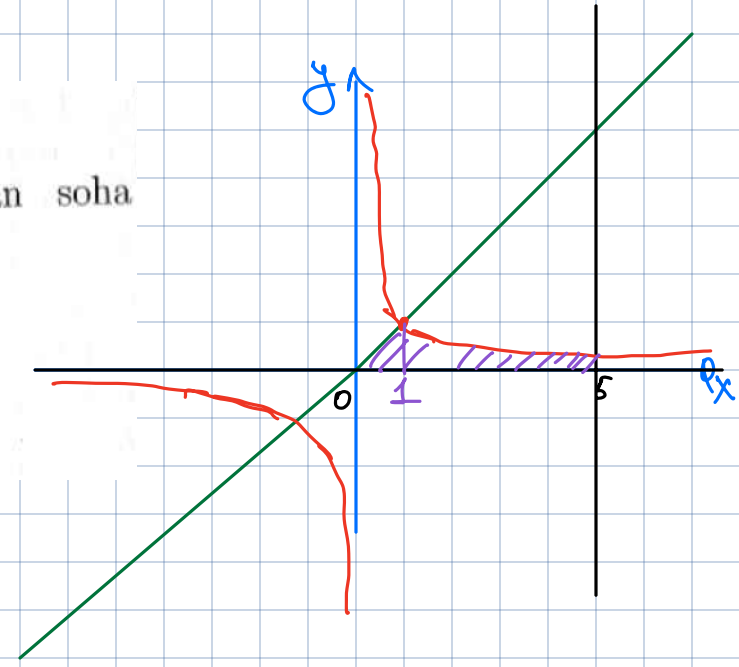


$S = \int_0^{\frac{\pi}{2}} \cos x\,dx + \int_{\pi}^{\frac{3\pi}{2}} -\cos x\,dx = \dots$

10) $y = x; y = \frac{1}{x}; y = 0; x = 5$ chiziqlar bilan chegaralangan soha yuzini toping.

A)$1 + \ln 5$ B)$\ln 5$

C)2 D)$\frac{1}{2} + \ln 5$



$S = \int_0^1 x\,dx + \int_1^5 \frac{1}{x}\,dx$

11) $y=0; x=0,5; x=3$ to'g'ri chiziqlar bilan hamda, $A(2;-1), B(4;3)$ va $C(6;15)$ nuqtlardan o'tuvchi parabola bilan chegaralangan soha yuzini toping.

A) $\frac{13}{8}$ B) $\frac{25}{24}$ C) $\frac{17}{9}$ D) $\frac{13}{2}$

$y = ax^2+bx+c$.

$$\begin{cases} 4a+2b+c=-1 \\ 16a+4b+c=3 \\ 36a+6b+c=15 \end{cases}$$

$$\begin{cases} -12a-2b=-4 \\ -20a-2b=-12 \end{cases}$$

$8a = 8$

$a=1$

$-12-2b=-4$

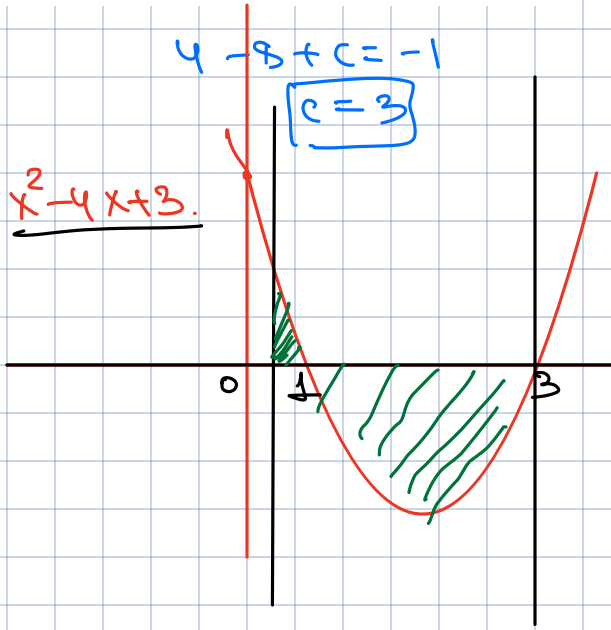
$-2b=8$

$b=-4$

$4-8+c=-1$

$c=3$

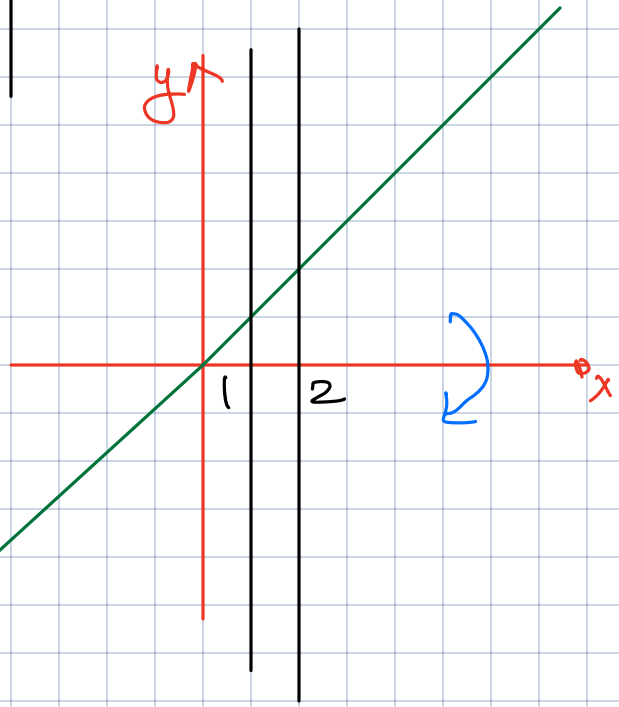
$y = x^2-4x+3$.



$$S = \int_{\frac{1}{2}}^{1}(x^2-4x+3)\,dx + \int_{1}^{3}(-x^2+4x-3)\,dx = \dots$$

12) $y=x; x=1$ va $x=2$ chiziqlar bilan chegaralangan sohani Ox o'qi atrofida 360° ga aylantirishdan hosil bo'lgan jism hajmini toping.

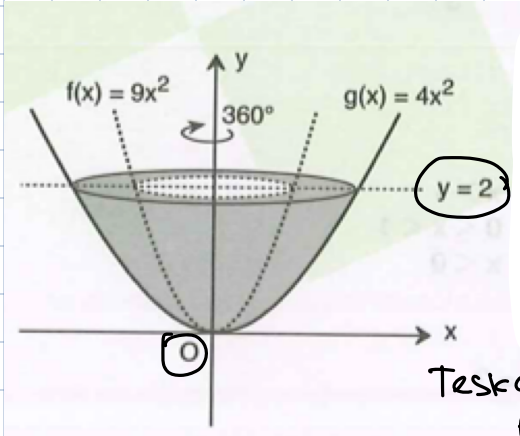
A) 2π B) $\frac{7\pi}{3}$ C) $\frac{8\pi}{3}$ D) 4π



$$V = \pi \int_a^b y^2\,dx$$

$$V = \pi \int_1^2 x^2\,dx = \frac{7\pi}{3}.$$

(13)



A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{6}$ D) $\frac{2\pi}{9}$ E) $\frac{5\pi}{18}$

y o'qi atrofida aylantirilsa.

$$V = \pi \cdot \int_a^b \left(\bar{g}^{-1}(x)\right)^2 - \left(\bar{f}^{-1}(x)\right)^2 dx.$$

$g(x) = 4x^2$ $\quad f(x) = 9x^2$

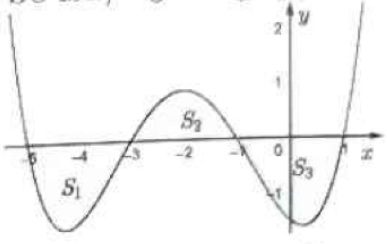
Teskari funksiya $\rightarrow$ $x = 4y^2$ $\rightarrow$ $x = 9y^2$

$y^2 = \frac{1}{4}x$ $\quad y^2 = \frac{x}{9}$

$$V = \pi \cdot \int_0^2 \left(\frac{x}{4} - \frac{x}{9}\right) dx = \frac{5\pi}{18}.$$

(14)

$S_1 = 4; S_2 = 5$ va $\int_{-5}^{1} f(x)dx = -5$ bo'lsa, S_3 ning qiymatini toping.



A)4 B)5 C)6 D)7

$$\int_{-5}^{1} f(x)\,dx = -S_1 + S_2 - S_3.$$

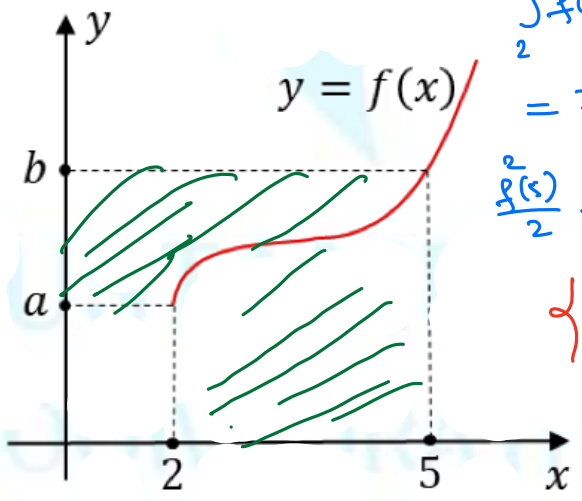
$$-5 = -4 + 5 - S_3$$

$$S_3 = 6.$$

15. Funksiya grafigidan $f(2)=a$, $f(5)=b$ berilgan. $\int_2^5 f(x)\cdot f'(x)dx = 13{,}5$ va $a+b=9$ bo'lsa,

$f(2)=a$

$f(5)=b$



$\int_2^5 f(x)\,d(f(x)) = \int_2^5 t\,dt$

$= \frac{t^2}{2} = \frac{f^2(x)}{2}\Big|_2^5$

$\frac{f^2(5)}{2} - \frac{f^2(2)}{2} = \frac{27}{2}$.

$\begin{cases} b^2-a^2=27 \\ a+b=9 \end{cases}$

$b=6 \quad a=3$

a) $\frac{a\cdot b}{2}$ **ni hisoblang.**

Javob a) 9.

b) $\int_2^5 f(x)dx + \int_a^b f^{-1}(x)dx$ **ni hisoblang** ($f^{-1}(x)$ – $f(x)$ –ning teskari funksiyasi).

Javob a) 24.

b) $\int_2^5 f(x) + \int_a^b f^{-1}(x) = b\cdot 5 - a\cdot 2 = 6\cdot 5 - 3\cdot 2 = 24.$

16 $\int_a^b (f(x)+x\cdot f'(x))dx = 4$ va $f(b)=3, f(a)=2, a+b=3$ bo'lsa.

a) $a\cdot b$ ni toping.

Javob a) 2

b) $\int_{a-4}^{b+1} \frac{\sin 3x}{x^2+4}dx$ ni hisoblang.

Javob b)

$\int_{-3}^{3} \frac{\sin 3x}{x^2+4}dx$ → Toq funksiya

$x'\cdot f(x) + x\cdot f'(x) = (x\cdot f(x))'$

$\int_a^b (x\cdot f(x))'dx = xf(x)\Big|_a^b = bf(b) - af(a) = 4$

$\begin{cases} 3b-2a=4 \\ a+b=3 \end{cases}$

$a=1$

$b=2$