Анықталған интегралдың көмегімен жазық фигуралардың ауданы мен айналу денелерінің көлемін есептеу

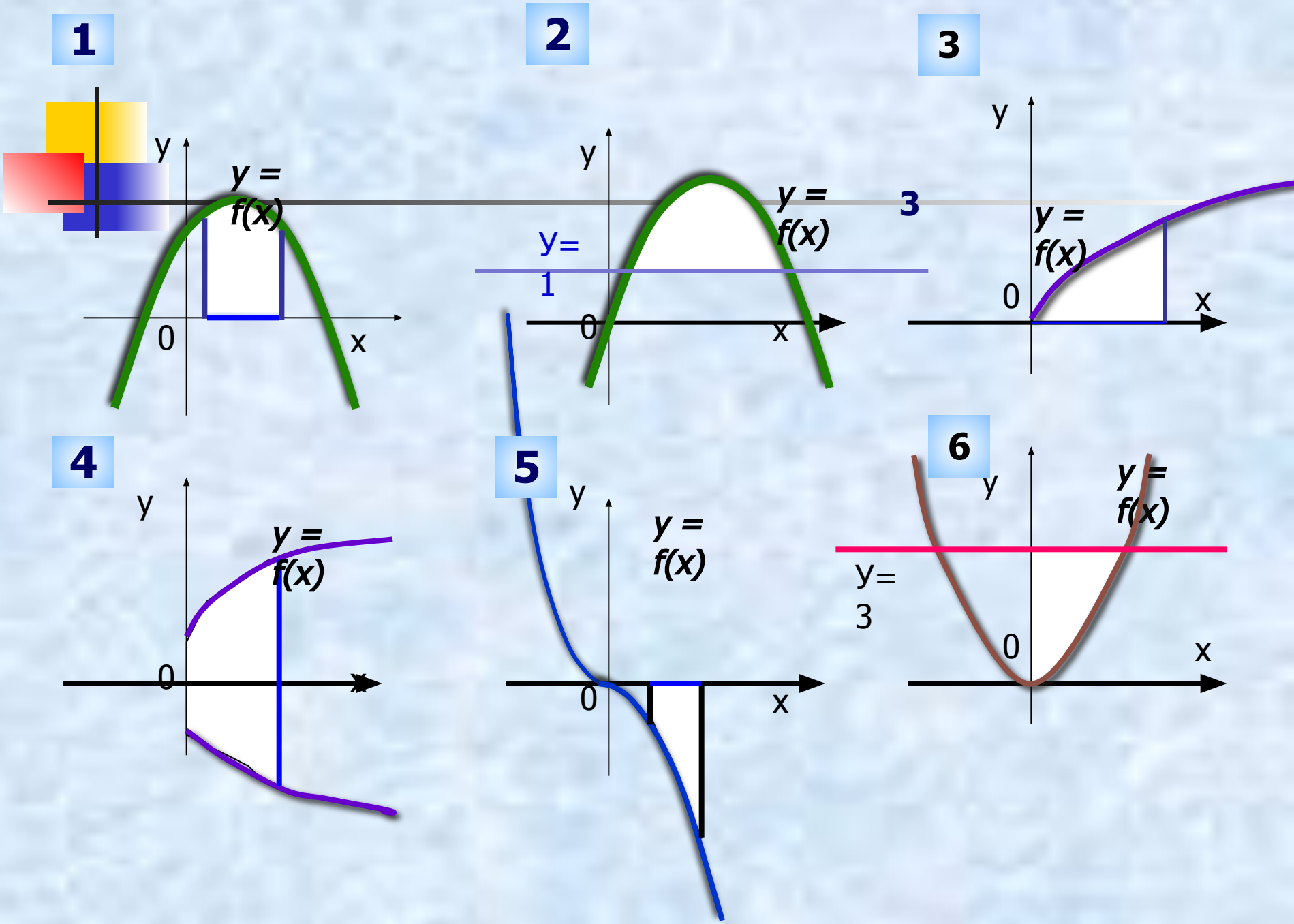
Оқу мақсаты:

- 11.3.1.6 - берілген сызықтармен шектелген жазық фигураның ауданын есептеу;

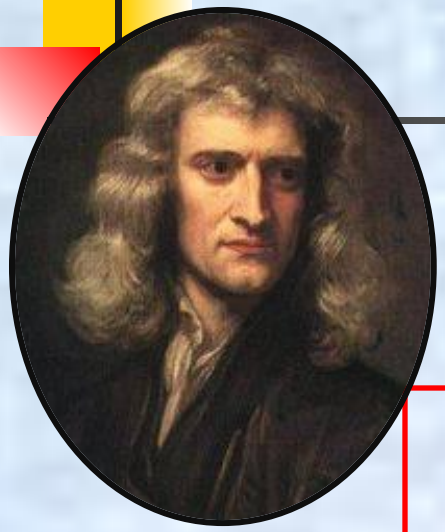
Суреттегі штрихталған фигуралардың қайсыеы қиеық трапеция болып табылады және қайсысы жоқ?

Таблицаны толтырыңыз

№1	ия/жоқ
№2	
№3	
№4	
№5	
№6	


1
y
y = f(x)
0
x
2
y
y = f(x)
y= 1
0
x
3
3
y
y = f(x)
0
x
4
y
y = f(x)
0
x
5
y
y = f(x)
0
x
6
y
y = f(x)
y= 3
0
x

Ньютона-Лейбница формуласы



1643—1727

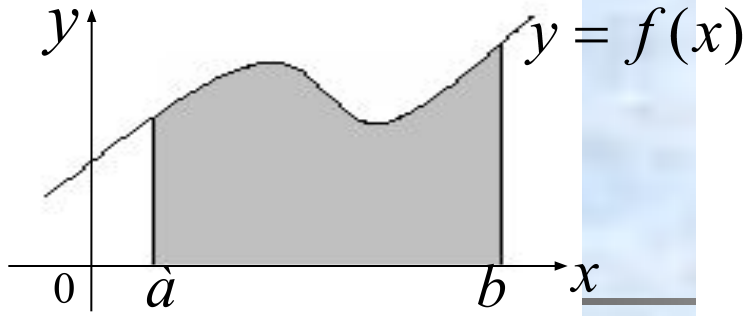
$$S = F(b) - F(a)$$

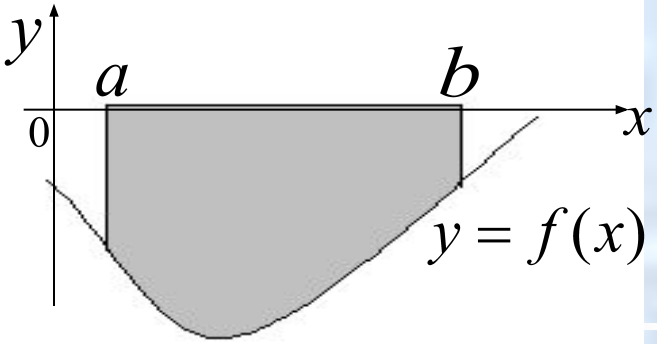
$$\int_a^b f(x)dx = F(b) - F(a)$$

$$\boxed{\int_a^b f(x)dx = F(b) - F(a)}$$

$$S = \int_a^b f(x)dx$$

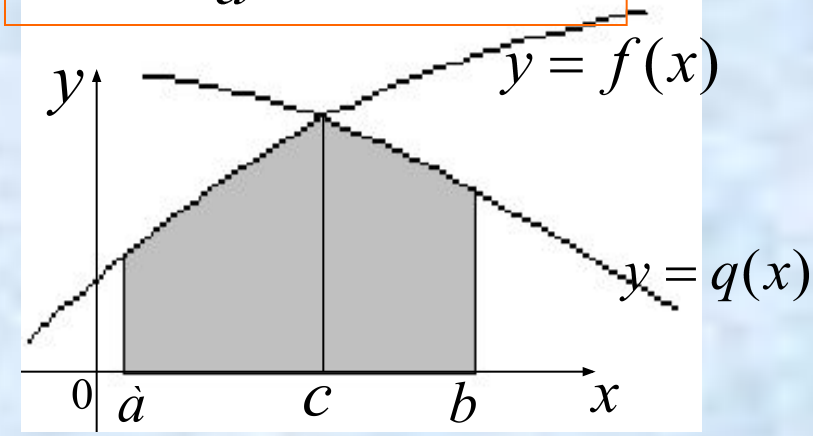
1646—1716

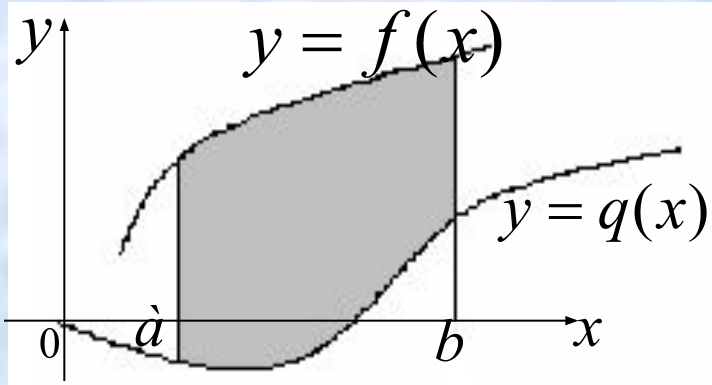




$$S = \int_a^b f(x)dx$$

$$S = -\int_a^b f(x)dx$$



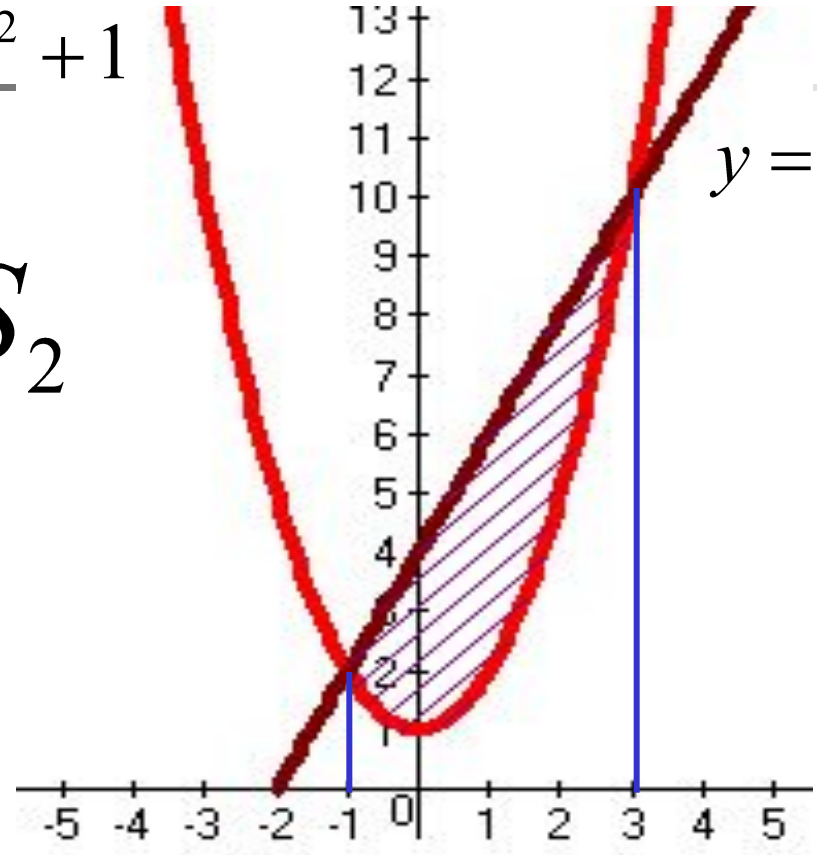


$$S = \int_a^{\tilde{n}} f(x)dx + \int_{\tilde{n}}^b q(x)dx$$

$$S = \int_a^b \left(f(x) - q(x)\right)dx$$

$$y = x^2 + 1$$

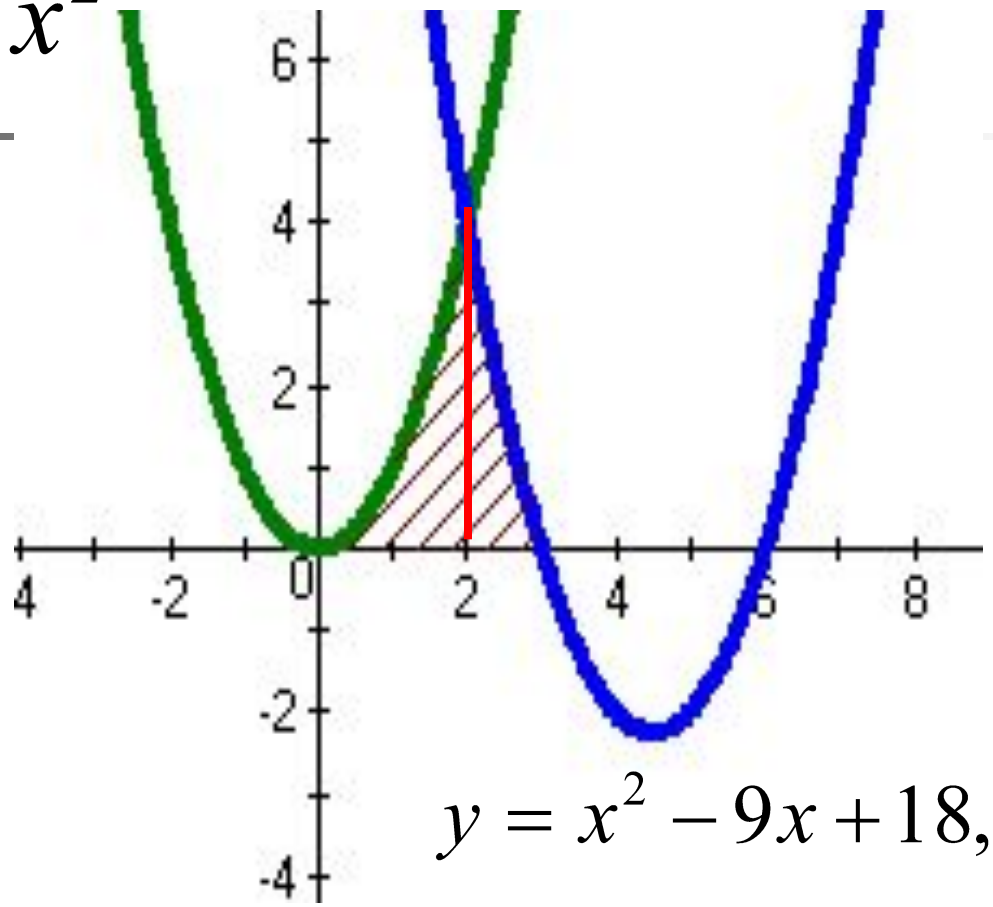
$$S = S_1 - S_2$$



$$y = 2x + 4$$

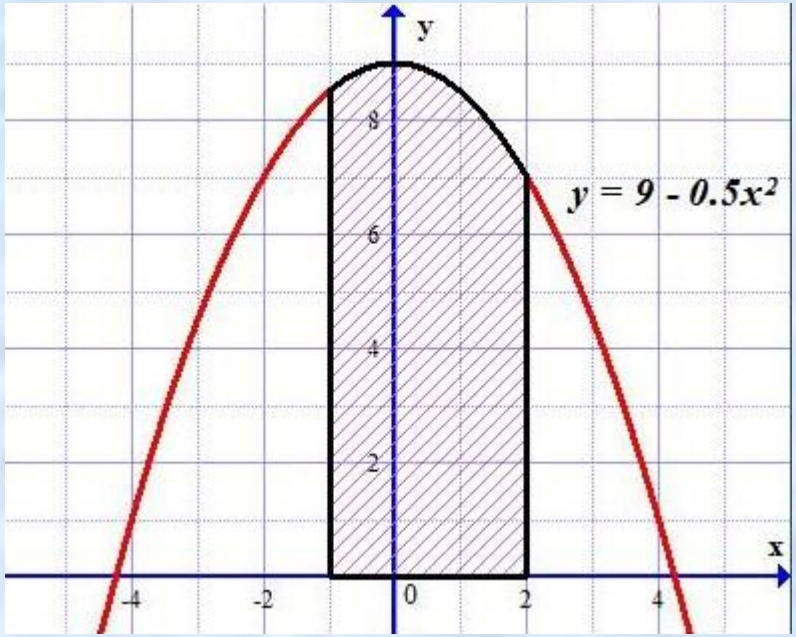
$$y = x^2$$

$$S = S_1 + S_2$$



$$y = x^2 - 9x + 18{,}25$$

$y = 9 - 0.5x^2$ параболасымен және $x = -1$, $x = 2$ түзулері мен *Ox осі арқылы шектелген фигураның ауданын табыңыз*

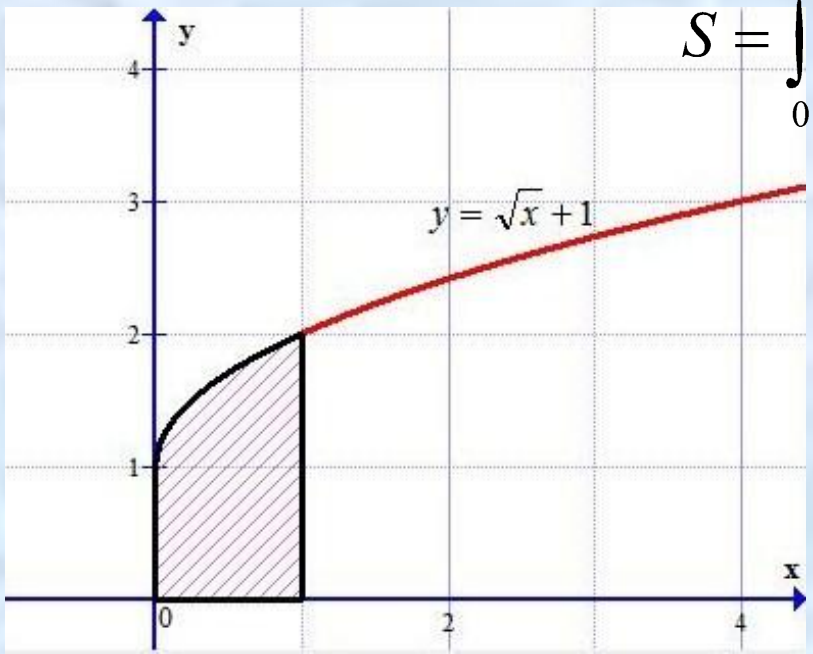


$$S = \int_{-1}^{2}\left(9 - \frac{x^2}{2}\right)dx = \left(9x - \frac{x^3}{6}\right)\Bigg|_{-1}^{2} =$$

$$= \left(9\cdot 2 - \frac{2^3}{6}\right) - \left(9(-1) - \frac{(-1)^3}{6}\right) = 25.5$$

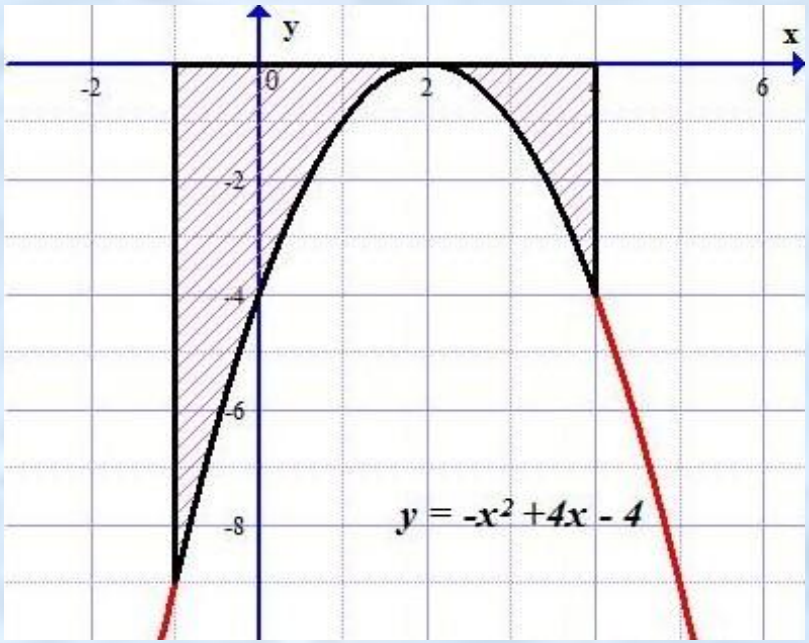
- Жауабы: 25.5 ед^2

Суретте көрсетілген фигураның ауданын табыңыз



$$S = \int_0^1 \left(\sqrt{x} + 1\right) dx = \left(\frac{2}{3} x^{3/2} + x\right)\Bigg|_0^1 = 1\frac{2}{3}$$

$y = -x^2 + 4x - 4$, $y = 0$, $x = -1$ және $x = 4$ сызықтарымен шектелген фигураның ауданын табыңыз.



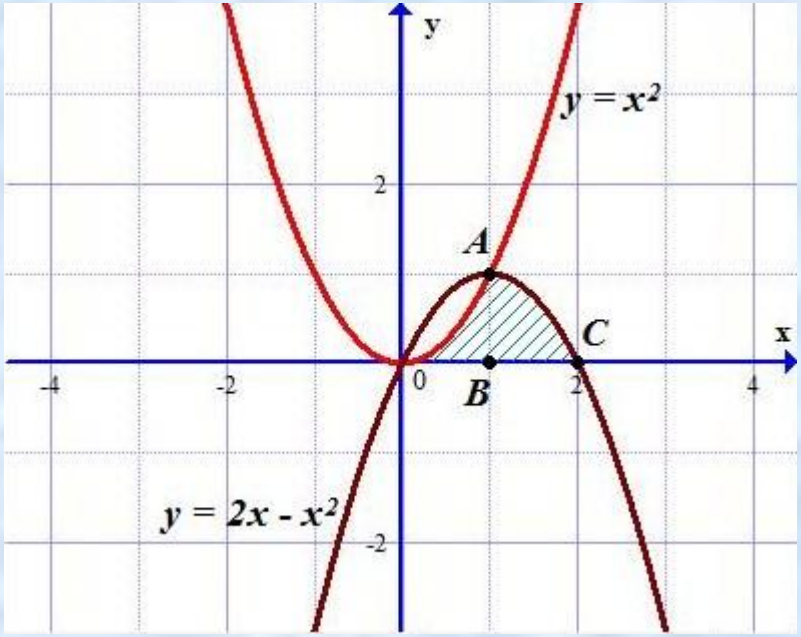
$$S = -\int_{-1}^{4}\left(-x^2 + 4x - 4\right)dx =$$

$$= -\left(-\frac{1}{3}x^3 + 2x^2 - 4x\right)\Bigg|_{-1}^{4} =$$

$$= -\left(\left(-\frac{64}{3} + 2\cdot 16 - 16\right) - \left(\frac{1}{3} + 2 + 4\right)\right) =$$

$$= -\left(-\frac{65}{3} + 10\right) = 11\frac{2}{3}$$

$y = x^2$, $y = 2x - x^2$ параболаларымен және *Ох осімен шектелген фигураның ауданын табыңыз*

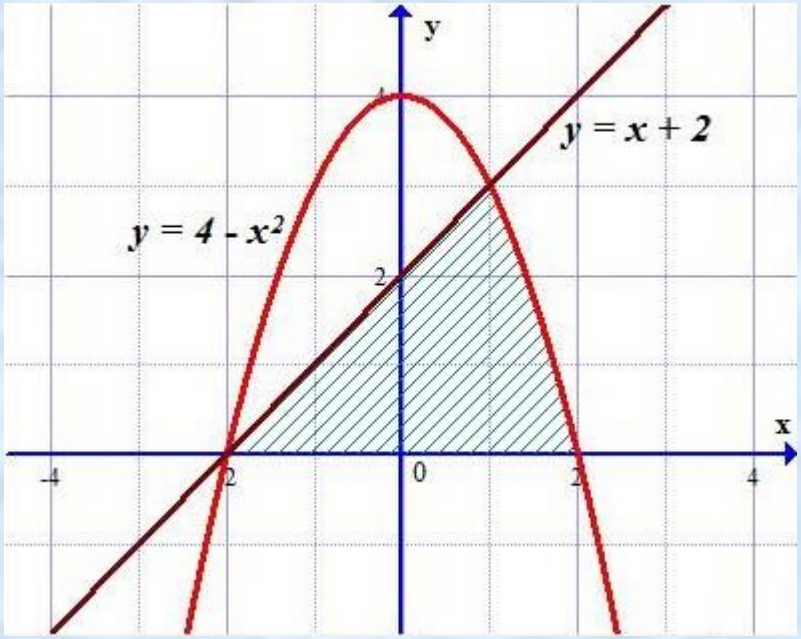


$$x^2 = 2x - x^2$$

$$x_1 = 0; x_2 = 1$$

$$S = \int_0^1 x^2 dx + \int_1^2 \left(2x - x^2\right) dx = 1$$

$y = 4 - x^2$, $y = x + 2$ сызықтарымен және Ox осімен шектелген фигураның ауданын табыңыз



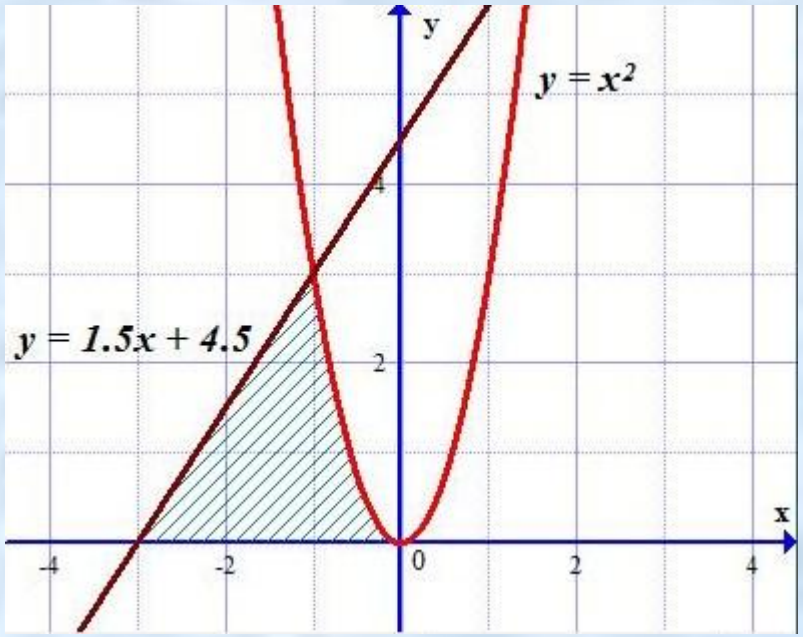
$$4 - x^2 = x + 2$$

$$x_1 = -2; x_2 = 1$$

$$S = \int_{-2}^{1} \left(4 - x^2\right) dx + \int_{1}^{2} (x + 2) dx =$$

$$= 6\frac{1}{6}$$

$y = 3x^2$, $y = 1.5x + 4.5$ параболаларымен және *Ox оімен шектелген фигураның ауданын табыңыз.*



$$S = \int_{-3}^{-1} (1.5x - 4.5)dx + \int_{-1}^{0} x^2 dx =$$

$$= 4$$