

11-SINF YAKUNIY IMTIHON JAVOBLARI

1 VARIANT

Algebra 1-qism (qisqa javobli)

1. Ifodaning qiymatini toping: $\sqrt[3]{(\sqrt{11} + \sqrt{3})(\sqrt{11} - \sqrt{3})}$

$$\sqrt[3]{(\sqrt{11} + \sqrt{3})(\sqrt{11} - \sqrt{3})} = \sqrt[3]{(\sqrt{11})^2 - (\sqrt{3})^2} = \sqrt[3]{11 - 3} = \sqrt[3]{8} = 2$$

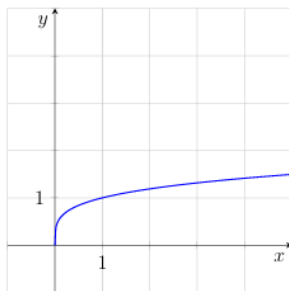
2. Ifodaning qiymatini toping: $2\log_{20} 2 + \log_{20} 5$

$$2\log_{20} 2 + \log_{20} 5 = \log_{20} 2^2 + \log_{20} 5 = \log_{20} 4 + \log_{20} 5 = \log_{20} 20 = 1$$

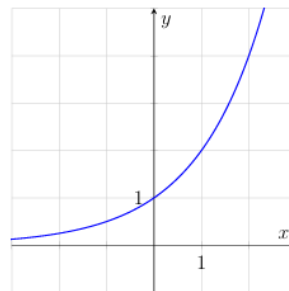
3. $6(\cos 2\alpha + \sin^2 \alpha) \operatorname{tg}^2 \alpha$ ifodani soddalashtirib, uning $\alpha = \frac{3\pi}{4}$ dagi qiymatini toping.

$$6(\cos^2 \alpha + \sin^2 \alpha) \operatorname{tg}^2 \alpha = 6 \cdot 1 \cdot \operatorname{tg}^2 \alpha = 6 \cdot 1 = 6$$

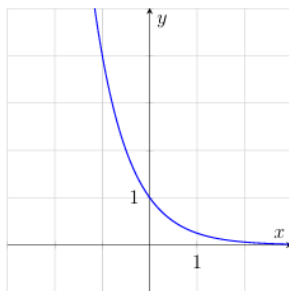
4. Quyida keltirilgan oltita funksiya dan to'rttasining grafiklari rasmda tasvirlangan. Grafiklarga mos funksiyaning nomini toping va to'g'ri javoblarni mos keltiring.



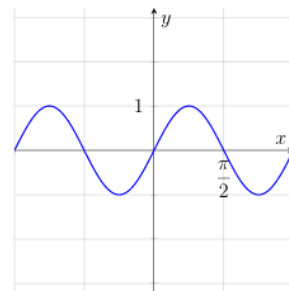
A



B



C



D

Funksiyalar:

1) $y = \log_4 x$

3) $y = \sqrt[4]{x}$

5) $y = \sin 2x$

2) $y = \left(\frac{1}{4}\right)^x$

4) $y = \operatorname{tg} 2x$

6) $y = 2^x$

	A	B	C	D
Javob:	3	6	2	5

5. Tenglamani yechib, ildizlarining yig'indisini toping. $\sqrt{2x-2}(x^2-25) = 0$

$$\sqrt{2x-2} = 0 \Rightarrow x = 1$$

$$x^2 - 25 = 0 \Rightarrow x = \pm 5$$

$$2x - 2 \geq 0 \Rightarrow x \geq 1$$

6. $f(x) = \frac{x}{x-3}$ funksiya berilgan. $f'(4)$ ni toping. Bunda $f'(x) - f(x)$ funksiyaning hosilasi.

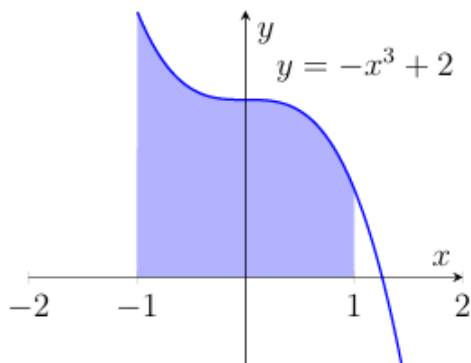
$$f(x) = \frac{x}{x-3}$$

$$f'(x) = \frac{(x-3) - x}{(x-3)^2} = \frac{-3}{(x-3)^2}$$

$$f'(4) = \frac{-3}{(4-3)^2} = \frac{-3}{1^2} = -3$$

Javob: -3

7. Rasmda $y = -x^3 + 2$ kubik funksiyaning grafigi tasvirlangan. Bo'yalgan shaklning yuzini toping.



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

8. "Oshxona" kafesida ertalab "Yengil nonushta" to'plamini buyurtma qilish mumkin. U bir ichimlik (choy, qahva, ayron, kompot) va bir pishiriqdan (somsa, qatlama yoki bo'g'irsoq) iborat. Shunday to'plamning nechta turli juftligi mavjud?

$$4 * 3 = 12$$

Javob: 12 ta

9. Samarqand universitetida abituriyentlar test topshirish uchun tasodifiy ravishda uchta auditoriyaga taqsimlanadi. Avval ikki auditoriyaga 80 nafardan o'tkaziladi, qolganlari zaxira

auditoriyaga joylashtiriladi. Birinchi kuni testga 200 nafar abituriyent keldi. Farhodning zaxira auditoriyaga tushish ehtimolini toping.

$$200 - 80 - 80 = 40$$

Ehtimollik:

$$P = \frac{40}{200} = \frac{1}{5} = 0.2$$

Algebra 2-qism (to'liq yechimli)

10. Ahror Toshkentdan dala hovliga o'rtacha 60 km/h tezlikda yo'l oldi va safarga 1,5 soat sarfladi. Shu yo'l orqali qaytishda u tirbandlikka tushib, o'rtacha 45 km/h tezlikda harakatlandi. Ahror qaytish yo'liga qancha vaqt sarfladi?

$$S = 60 \cdot 1.5 = 90$$

$$t = \frac{90}{45} = 2$$

Javob: 2 soat

11. Tenglamani yeching:

$$\sin 2x + 2\sin^2 x = 0$$

$$\sin 2x + 2\sin^2 x = 0$$

$$2\sin x \cos x + 2\sin^2 x = 0$$

$$2\sin x(\cos x + \sin x) = 0$$

$$\sin x = 0 \quad \text{yoki} \quad \sin x + \cos x = 0$$

$$x = \pi k$$

$$\tan x = -1 \Rightarrow x = -\frac{\pi}{4} + \pi k$$

Javob:

$$x = \pi k \quad \text{yoki} \quad x = -\frac{\pi}{4} + \pi k, \quad k \in \mathbb{Z}$$

12. $f(x) = -x^3 + 6x^2 + 1$ funksiyaning o'sish va kamayish oraliqlari hamda ekstremumlarini toping.

$$f = -x^3 + 6x^2 + 1$$

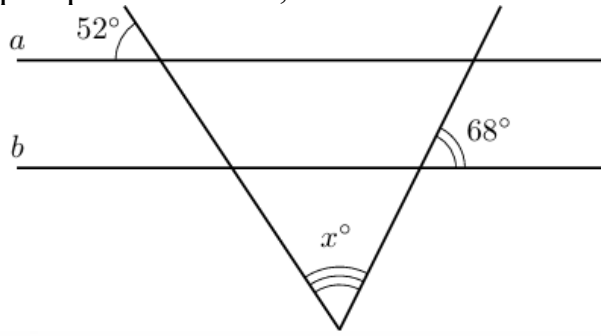
$$f' = -3x^2 + 12x = -3x(x - 4).$$

O'sadi: $(0; 4)$. Kamayadi: $(-\infty; 0) \cup (4; \infty)$.

Min: $x = 0, f = 1$. Max: $x = 4, f = 33$.

Geometriya 1-qism (qisqa javobli)

1. Agar a va b to'g'ri chiziqlari parallel bo'lsa, noma'lum x burchakning qiymatini toping.



$$x = 180^\circ - 52^\circ - 68^\circ = 60^\circ$$

2. To'g'ri burchakli uchburchakning yuzi 60 cm^2 ga, katetlaridan biri 8 cm teng bo'lsa, uning gipotenuzasi uzunligini toping. (cm)

$$S = 60, a = 8$$

$$\frac{8b}{2} = 60 \Rightarrow 4b = 60 \Rightarrow b = 15$$

$$c = \sqrt{8^2 + 15^2} = \sqrt{64 + 225} = \sqrt{289} = 17$$

3. Pitsa qutisi muntazam to'rtburchakli prizma shaklida bo'lib, uning asos tomoni 40 cm ga, balandligi esa 3 cm ga teng. Qutini tayyorlash jarayonida uni mustahkamlash maqsadida umumiy karton miqdoriga qo'shimcha ravishda 10% karton qo'shilishi talab etiladi. Qutini mustahkamlovchi qismlari bilan birga tayyorlash uchun jami necha cm^2 karton kerak bo'lishini toping.

$$S = 2a^2 + 4ah$$

$$S = 2 \cdot 40^2 + 4 \cdot 40 \cdot 3 = 2 \cdot 1600 + 4 \cdot 120 = 3200 + 480 = 3680 \text{ cm}^2$$

$$10\% \text{ qo'shimcha: } 3680 \cdot 0,1 = 368 \text{ cm}^2$$

$$\text{Jami: } 3680 + 368 = 4048 \text{ cm}^2$$

4. Silindr asosining yuzi $9\pi \text{ cm}^2$ ga, balandligi esa 5 cm ga teng bo'lsa, uning o'q kesimining yuzini cm^2 da toping.

$$S_{asos} = 9\pi \Rightarrow r = 3.$$

O'q kesim yuzi:

$$S = 2r \cdot h = 6 \cdot 5 = 30.$$

Javob: 30 cm^2

5. Konusning o'q kesimi yon tomoni $2\sqrt{10}$ cm va asosi 4 cm bo'lgan teng yonli uchburchakdan iborat bo'lsa, konusning hajmini cm^3 da toping. ($\pi = 3$ deb oling)

$$2r = 4 \Rightarrow r = 2, \quad l = 2\sqrt{10}$$

$$h = \sqrt{l^2 - r^2} = \sqrt{40 - 4} = 6$$

$$V = \frac{1}{3}\pi r^2 h \Rightarrow \frac{1}{3} \cdot 3 \cdot 4 \cdot 6 = 24$$

Javob: 24 cm^3

6. $ABCD$ parallelogramning uchta uchi koordinatalari bilan berilgan: $A(5; -1; 0)$, $B(-5; 3; 2)$, $C(2; 2; -2)$. D uchining koordinatalarini aniqlab, ularning yig'indisini toping.

$$D = A + C - B$$

$$D = (5; -1; 0) + (2; 2; -2) - (-5; 3; 2) = (12; -2; -4)$$

Yig'indi: $12 - 2 - 4 = 6$

Javob: 6

Geometriya 2-qism (to'liq yechimli)

7. To'g'ri burchakli trapetsiyaning asoslari 12 cm va 8 cm, burchaklardan biri 135° ga teng. Trapetsiyaning yuzini toping.

$$12 - 8 = 4, \quad h = 4$$

$$S = \frac{12 + 8}{2} \cdot 4 = 40$$

Javob: 40 cm^2

8. Uchburchakli piramidaning asosi katetlari 10 cm va 24 cm ga teng bo'lgan to'g'ri burchakli uchburchakdan iborat. Agar piramidaning barcha yon qirralari $\sqrt{269}$ cm ga teng bo'lsa, uning hajmini toping.

$$S_{asos} = \frac{1}{2} \cdot 10 \cdot 24 = 120$$

Gipotenuza: 26, demak $R = 13$

$$h = \sqrt{269 - 13^2} = \sqrt{100} = 10$$

$$V = \frac{1}{3} \cdot 120 \cdot 10 = 400$$

Javob: 400 cm^3

7 VARIANT

Algebra 1-qism (qisqa javobli)

1. Ifodaning qiymatini toping: $\frac{5^{11}}{25^5} - \sqrt[3]{\frac{27}{8}}$

$$\frac{5^{11}}{25^5} - \sqrt{\frac{27}{8}} = \frac{5^{11}}{(5^2)^5} - \frac{3}{2} = \frac{5^{11}}{5^{10}} - \frac{3}{2} = 5^3 \frac{3}{2} = \frac{10}{2} - \frac{3}{2} = \frac{7}{2}$$

Javob: $\frac{7}{2}$

2. Ifodaning qiymatini toping: $\log_3 18 - \log_3 2 - \log_{25} 5$

$$\log_3 18 - \log_3 2 - \log_{25} 5$$

$$\log_3 18 - \log_3 2 - \log_{25} 5 = \log_3 \frac{18}{2} - \frac{1}{2} = \log_3 9 - \frac{1}{2} = 2 - \frac{1}{2} = \frac{3}{2}$$

3. $4tg(\pi - \alpha)\sin\left(\frac{\pi}{2} - \alpha\right)$ ifodani soddalashtirib, uning $\alpha = \frac{5\pi}{6}$ dagi qiymatini toping.

Yechim:

$$4tg(\pi - \alpha)\sin\left(\frac{\pi}{2} - \alpha\right) = 4(-tg\alpha)\cos\alpha = -4\sin\alpha = -4 \cdot \frac{1}{2} = -2$$

1. $tg(\pi - \alpha) = -tg\alpha$ (tangensning qo'shni burchak uchun formulasi)

2. $\sin\left(\frac{\pi}{2} - \alpha\right) = \cos\alpha$ (sinusning kofunksiyasi)

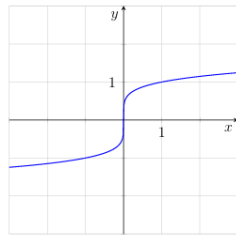
3. Shuning uchun: $4tg(\pi - \alpha)\sin\left(\frac{\pi}{2} - \alpha\right) = 4(-tg\alpha)\cos\alpha$

4. $tg\alpha = \frac{\sin\alpha}{\cos\alpha} \Rightarrow (-tg\alpha)\cos\alpha = -\sin\alpha \Rightarrow -4\sin\alpha$

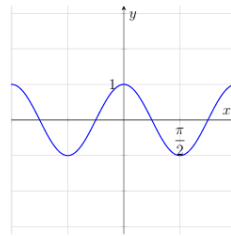
5. $\sin\alpha = \frac{1}{2}$ berilgan, shuning uchun: $-4\sin\alpha = -4 \cdot \frac{1}{2} = -2$

Javob: -2

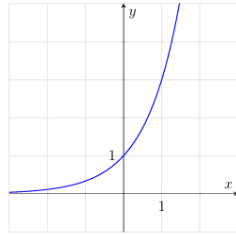
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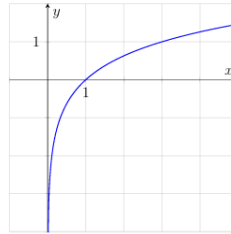
A



B



C



D

Funksiyalar:

1) $y = \sin 2x$

3) $y = \log_3 x$

5) $y = \sqrt[5]{x}$

2) $y = \cos 2x$

4) $y = \left(\frac{1}{4}\right)^x$

6) $y = 3^x$

	A	B	C	D
Javob:	3	6	2	5

5. Tenglamani yeching. $\sqrt{2x + 8} = x$

$$\sqrt{x^2 - 10} = \sqrt{3x}$$

$$x^2 - 10 = 3x \Rightarrow x^2 - 3x - 10 = 0 \Rightarrow x = 5.$$

6. $f(x) = 2e^{x^2-2x}$ funksiya berilgan. $f'(2)$ ni toping. Bunda $f'(x) - f(x)$ funksiyaning hosilasi.

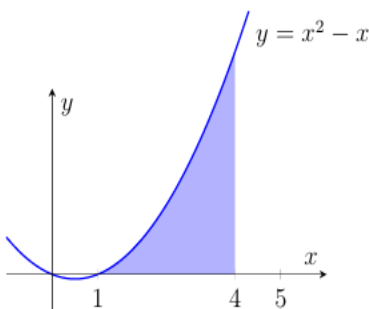
$$f(x) = 2e^{x^2-2x}$$

$$f'(x) = 2e^{x^2-2x}(2x - 2)$$

$$f'(2) = 2 \cdot 1 \cdot 2 = 4$$

Javob: 4

7. Rasmda $y = x^2 - x$ kvadrat funksiyaning grafigi tasvirlangan. Bo‘yalgan shaklning yuzini toping.



$$S = \int_1^4 (x^2 - x) dx = \left(\frac{x^3}{3} - \frac{x^2}{2}\right)_1^4 = \left(\frac{64}{3} - 8\right) - \left(\frac{1}{3} - \frac{1}{2}\right) = \frac{27}{2}$$

8. Universitet kutubxonachisi Alisher Navoiyga bag'ishlangan ko'rgazma uchun uning noyob asarlarini – «Xamsa», «Xazoyin ul-maoniy», «Mahbub ul-qulub» va lirik to'plamni – bitta javonga bir qator qilib joylashtirmoqchi. Kitoblarni nechta usulda joylashtirish mumkin?

Yechim: $4! = 24$

Javob: 24 ta

9. Feruz otasi bilan «Ashxobod» bog'idagi charxpalakda uchishga qaror qildi. Charxpalakda jami 20 ta uchish uchun xona bor: ulardan 4 tasi ko'k, 8 tasi yashil, qolganlari sariq rangda. Xonalar navbat bilan yo'lovchilarni qabul qilish maydonchasiga keladi. Feruzning sariq xonada uchish ehtimolini toping.

$$P = \frac{8}{20} = \frac{2}{5} = 0.4$$

Algebra 2-qism (to'liq yechimli)

10. Zavodda ikkita ishlab chiqarish qurilmasi bor. Ular bir xil mahsulot ishlab chiqaradi. Ikkinchi qurilma bir soatda birinchisiga qaraganda 3 ta ko'proq mahsulot ishlab chiqaradi. 5 soatlik birgalikdagi ish davomida ular 155 ta mahsulot yig'ishdi. Har bir qurilma bir soatda nechta mahsulot ishlab chiqaradi?

$$5(x + x + 3) = 155$$

$$2x + 3 = 31, \quad x = 14$$

$$x + 3 = 17$$

Javob: 14 ta va 17 ta

11. Tenglamani yeching:

$$\sin 2x + \sqrt{2} \cos x = 0$$

$$\sin 2x + \sqrt{2} \cos x = 0$$

$$\sin 2x + \sqrt{2} \cos x = 0$$

$$2 \sin x \cos x + \sqrt{2} \cos x = 0$$

$$\cos x(2 \sin x + \sqrt{2}) = 0$$

Javob:

$$x = \frac{\pi}{2} + \pi k; \quad x = -\frac{\pi}{4} + 2\pi k; \quad x = \frac{5\pi}{4} + 2\pi k$$

12. $f(x) = x^3 - 3x + 4$ funksiyaning o'sish va kamayish oraliqlari hamda ekstremumlarini toping.

Geometriya 1-qism (qisqa javobli)

1. Teng yonli trapetsiya burchaklarining biri ikkinchisidan 58° ga katta. Ushbu trapetsiyaning kichik burchagi qiymatini toping.

$$x + x + 58^\circ = 180^\circ$$

$$2x + 58^\circ = 180^\circ$$

$$2x = 122^\circ$$

$$x = 61^\circ$$

2. To'g'ri burchakli ABC uchburchakning AB gipotenuzasi 10 cm ga teng va $\sin B = \frac{\sqrt{51}}{10}$ bo'lsa,

BC kateti uzunligini toping. (cm)

$$AB = 10, \sin B = \frac{\sqrt{51}}{10}$$

$$\sin B = \frac{AC}{AB} \rightarrow AC = \sqrt{51}$$

$$BC = \sqrt{10^2 - (\sqrt{51})^2} = \sqrt{100 - 51} = 7$$

Javob: 7 cm

3. Quti to'g'ri to'rtburchakli parallelepiped shaklida bo'lib, uning bo'yi 30 cm, eni 25 cm va balandligi 10 cm ga teng. Quti tasma bilan bezatiladi: tasma qutining bo'yi bo'ylab ikki marta, eni bo'ylab ikki marta aylantirib o'raladi hamda yuqori qopqog'ining o'rtasida bant bog'lanadi. Agar bant uchun 25 cm tasma sarflansa, qutini bezash uchun jami necha metr tasma kerak bo'ladi?

Bo'yi bo'ylab: $2 \cdot (30 + 10) = 80$ cm, ikki marta: 160 cm

Eni bo'ylab: $2 \cdot (25 + 10) = 70$ cm, ikki marta: 140 cm

Bant: 25 cm

Jami: $160 + 140 + 25 = 325$ cm = 3,25 m

4. Qirradi 4 cm ga teng kubga ichki chizilgan sharning hajmini cm^3 da toping. ($\pi = 3$ deb oling).

$$S = rh = 36$$

Bunda $r = h$, demak:

$$r^2 = 36 \Rightarrow r = 6, \quad h = 6$$

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \cdot 3 \cdot 36 \cdot 6 = 216$$

Javob: 216 cm^3

5. Konusning o'q kesimi yuzi 36 cm^2 ga teng bo'lgan to'g'ri burchakli uchburchakdan iborat bo'lsa, konusning hajmini cm^3 da toping. ($\pi = 3$ deb oling).

O'q kesim to'g'ri burchakli teng yonli uchburchak.

$$S = rh = 36$$

Bunda $r = h$, demak:

$$r^2 = 36 \Rightarrow r = 6, \quad h = 6$$

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \cdot 3 \cdot 36 \cdot 6 = 216$$

Javob: 216 cm^3

6. Sfera $(x - 3)^2 + (y + 2)^2 + (z - 6)^2 = 16$ tenglama bilan berilgan. Koordinatalar boshidan sferaning unga eng yaqin nuqtasigacha bo'lgan masofani toping.

Sfera markazi: $O_1(3; -2; 6)$, radius $r = 4$

Markazdan koordinatalar boshigacha masofa:

$$\sqrt{3^2 + (-2)^2 + 6^2} = \sqrt{49} = 7$$

Eng yaqin masofa: $7 - 4 = 3$

Javob: 3

Geometriya 2-qism (to'liq yechimli)

7. Rombning yuzi 30 cm^2 , uning diagonallaridan biri 10 cm . Rombning tomonini toping.

$$30 = \frac{10 \cdot d_2}{2} \Rightarrow d_2 = 6$$

$$a = \sqrt{5^2 + 3^2} = \sqrt{34}$$

Javob: $\sqrt{34} \text{ cm}$

8. Muntazam to'rtburchakli piramida asosining diagonali $10\sqrt{2} \text{ cm}$ ga teng bo'lib, yon yoqlarining asos tekisligiga og'ish burchagi 60° ga teng bo'lsa, uning to'la sirti yuzini toping.

$$d = 10\sqrt{2} \Rightarrow a = 10$$

$$h = 5 \tan 60^\circ = 5\sqrt{3}$$

$$\text{Yon apofema: } l = \sqrt{(5\sqrt{3})^2 + 5^2} = 10$$

$$S_{yon} = 4 \cdot \frac{1}{2} \cdot 10 \cdot 10 = 200$$

$$S_{asos} = 100$$

$$S_{to'la} = 300$$

Javob: 300 cm^2