

MATEMATIKA

1. a, b, c turli tub sonlar bo'lsa, $a \cdot b \cdot c$ ko'paytmaning eng kichik qiymatini toping.

- A) 70
- B) 30
- C) 105
- D) 42

2. a va b natural sonlar uchun $\frac{a}{7} + \frac{b}{3} = 5$ bo'lsa, a ning eng katta qiymatini toping.

- A) 14
- B) 21
- C) 28
- D) 35

3. $|x - 1| + |x + 1| + |x - 2| + |x + 2| + \dots + |x - 2020| + |x + 2020|$ ifodani $x > 2020$ da hisoblang.

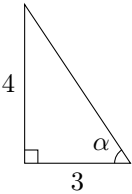
- A) $4020x$
- B) $4040x$
- C) $1010x$
- D) $2020x$

4. Alisher do'kondan donasi 1200 so'mdan bo'lgan ruchkalar va donasi 2400 so'mdan bo'lgan daftarlar sotib olgan. U ruchka va daftarlarni sotib olishda teng miqdorda pul sarflagan. U sotib olgan ruchkalar soni daftarlar sonidan 5 taga ko'p bo'lsa, u holda Alisher nechta ruchka sotib olgan?

- A) 8
- B) 12
- C) 10
- D) 9

5. Ifodaning qiymatini toping: $a^2 - 4a + 11$, bunda $a = 2 + \sqrt{5}$

- A) 7
- B) 12
- C) 5
- D) 13

6. x, y, z natural sonlar uchun $x^2 = y^3$ va $y^4 = z^2$ tengliklar o'rinli bo'lsa, quyidagi tengliklardan qaysi biri to'g'ri?
- A) $x^3 = z^2$
 B) $x^4 = z^3$
 C) $x^2 = z^3$
 D) $x^3 = z^4$
7. Agar $a = 1 + 2 + 3 + \dots + 39$ va $b = 37 + 38 + 39 + \dots + 50$ bo'lsa, $1+2+3+\dots+50$ yig'indini a va b orqali ifodalang.
- A) $a + b - 108$
 B) $a + b - 105$
 C) $a + b - 111$
 D) $a + b - 114$
8. Agar $a = -9$ bo'lsa, $216 + 108a + 18a^2 + a^3$ ifodaning qiymatini toping.
- A) -27
 B) -64
 C) -8
 D) -48
9. Soddalashtiring: $\frac{x + 6\sqrt{x} + 8}{\sqrt{x} + 4} - \frac{x + 6\sqrt{x-2} + 6}{\sqrt{x-2} + 4}$, bunda $x \geq 2$.
- A) $\sqrt{x} - \sqrt{x-2}$
 B) $\sqrt{x+2} - \sqrt{x}$
 C) $\sqrt{x+2} - \sqrt{x-2}$
 D) $\sqrt{x} + \sqrt{x-2}$
10. Chizmada berilgan ma'lumotlardan foydalanib, $\operatorname{tg} \alpha$ ning qiymatini toping.
- 
- A) $\frac{4}{3}$
 B) $\frac{3}{4}$
 C) $\frac{4}{5}$
 D) $\frac{3}{5}$

11. $\cos x + (2 + \sqrt{2}) \cdot \sin^2 x = 1$ tenglamaning $[0; 2\pi]$ kesmadagi yechimlari yig'indisini toping.

A) $\frac{7\pi}{2}$

B) 4π

C) $\frac{5\pi}{2}$

D) 3π

12. $2^{4x+3} - 2^{4x} - 7^{4x-1} - 7^{4x-2} = 0$ tenglamaning haqiqiy ildizi x_0 bo'lsa, $4 \cdot x_0$ ni toping.

A) 4

B) 3

C) 1,5

D) 6

13. $y = \sqrt{\log_{\frac{1}{3}}(x^2 - 2x) + 1}$ funksiyaning aniqlanish sohasini toping.

A) $[-1; 3]$

B) $(-\infty; -0) \cup (2; \infty)$

C) $[-1; 0) \cup (2; 3]$

D) $(-\infty; -1] \cup [3; \infty)$

14. $(3x^2 - 2) \sqrt{2x - 1} - x\sqrt{2x - 1} = 0$ tenglamaning ildizlari yig'indisini toping.

A) 1,5

B) 0,5

C) 2

D) 2,5

15. x va y butun sonlar uchun

$$\frac{|\sqrt{x+y} + \sqrt{2x+y+2} - 7| + |3x+2y-23|}{x+9} = 0$$

tenglik o'rinli bo'lsa, $x + y$ ning qiymatini toping.

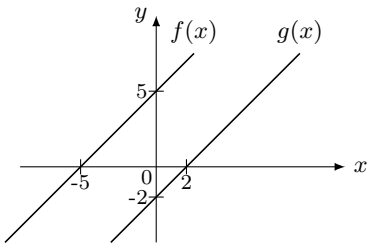
A) 25

B) 16

C) 9

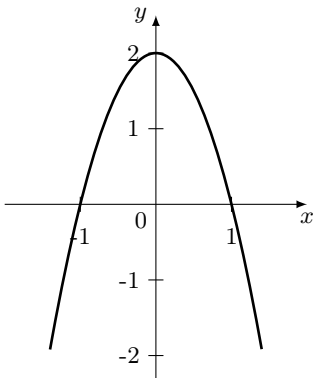
D) 9 yoki 16

16. Chizmada $f(x)$ va $g(x)$ funksiyalarning grafiklari tasvirlangan. Chizmada berilgan ma'lumotlardan foydalanib $f(x) \cdot g(x) < 0$ tengsizlikni yeching.



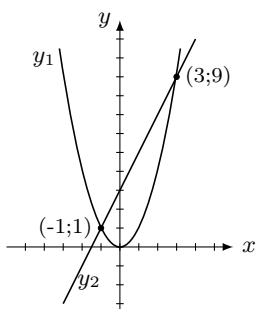
- A) $(-\infty; -5)$
- B) $(-\infty; -2)$
- C) $(-5; 2)$
- D) $(2; 5)$

17. Rasmda quyidagi kvadrat funksiyalardan qaysi birining grafigi tasvirlangan?

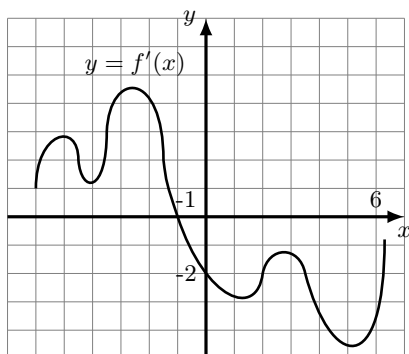


- A) $f(x) = -2x^2 + 2$
- B) $f(x) = -x^2 + 2x$
- C) $f(x) = -x^2 + 2$
- D) $f(x) = -x^2 + 2x + 2$

18. Rasmda $y_1 = ax^2$ funksiyaning grafigi va $y_2 = kx + l$ to'g'ri chiziq tasvirlangan. Agar bu funksiyalar $(-1; 1)$ va $(3; 9)$ nuqtalarda kesishgan bo'lsa, $\frac{k}{a} + l$ ni toping.

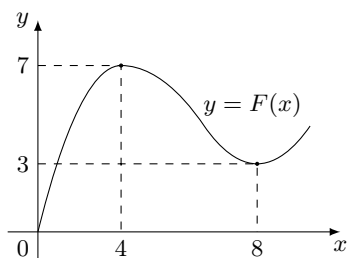


- A) 5
 B) 4
 C) 3
 D) 6
19. $f(x) = x^{2021} - \cos x$ funksiyaning hosilasini toping.
- A) $2021x^{2020} + \sin x$
 B) $2021x^{2020} - \sin x$
 C) $2021x^{2002} - \sin x$
 D) $2021x^{2022} + \sin x$
20. Rasmda $f'(x)$ funksiyaning grafigi tasvirlangan. $[-1; 5]$ kesmada $f(x)$ funksiya x ning qanday qiymatida eng kichik qiymatga erishadi?

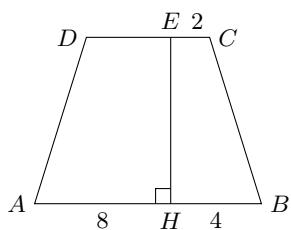


- A) 0
 B) 5
 C) -1
 D) -4

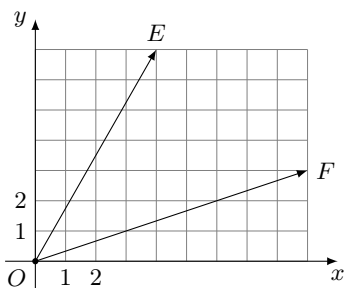
21. Koordinatalar sistemasida $y = F(x)$ funksiyaning grafigi tasvirlangan (rasm). Ushbu grafikdan foydalanib $\int_0^8 |f(x)| dx$ integralni hisoblang. Bunda $f(x) = F'(x)$.



- A) 3
 B) 11
 C) 7
 D) 14
22. Rasmda teng yonli $ABCD$ trapetsiya tasvirlangan. Agar bu trapetsiyaning o'rta chizig'i 10 ga teng bo'lsa, rasmda berilgan ma'lumotlardan foydalanib DE kesma uzunligini toping.

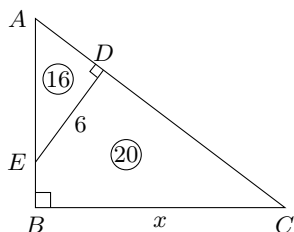


- A) 8
 B) 6
 C) 7
 D) 5
23. Koordinatalar sistemasida \vec{OE} va \vec{OF} vektorlar tasvirlangan (rasm). \vec{OE} va \vec{OF} vektorlarning skalar ko'paytmasini toping.



- A) 42
 B) 47
 C) 15
 D) 57

24. Chizmada ABC to'g'ri burchakli uchburchak berilgan. Agar $AD \perp ED$, $\angle B = 90^\circ$, $ED = 6$, $S_{BEDC} = 20$ va $S_{AED} = 16$ bo'lsa, $BC = x$ tomonning uzunligini toping.



- A) 12
 B) 10
 C) 8
 D) 9
25. Uchburchak tomonlari 41; 41; 80 ga teng bo'lsin. Bissektrisalar kesishish nuqtasidan katta tomongacha bo'lgan eng qisqa masofani toping.
- A) $4\frac{5}{9}$
 B) 3
 C) $4\frac{4}{9}$
 D) 4
26. Katetlari 12 cm va 16 cm bo'lgan to'g'ri burchakli uchburchakning uchlaridan bir xil 26 cm uzoqlikda joylashgan nuqtadan uchburchak tekisligigacha bo'lgan masofani (cm) toping.
- A) 24
 B) 25
 C) 22
 D) 20
27. $AB = 25$ cm kesmaning uchlaridan berilgan tekislikkacha bo'lgan masofalar $AC = 15$ cm va $BD = 22$ cm ga teng. AB kesmaning bu tekislikdagi proyeksiyasini (cm) toping.
- A) 18
 B) 21
 C) 27
 D) 24

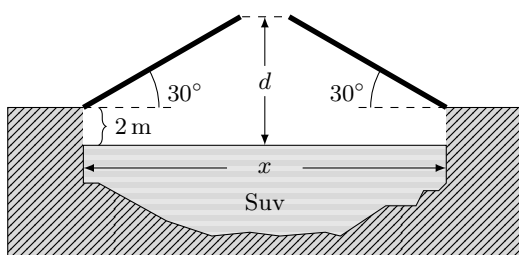
28. $A = \{1; 2; 3; 5; 6; 7; 8; 9; 10\}$ va $B = \{3; 5; 6; 7; 8; 10; 11\}$ to'plamlar berilgan. $A \cap B$ to'plamning qism to'plamlari sonini toping.

- A) 64
- B) 128
- C) 16
- D) 32

29. 6 ta xodimdan ixtiyoriy 2 tasini necha xil usulda tanlab olish mumkin?

- A) 10
- B) 30
- C) 15
- D) 12

30. Uzunligi $x = 100$ metr bo'lgan ko'prikl suv sathiga parallel ravishda undan 2 metr balandlikda joylashgan (rasm). Ko'prikl ostidan yuk kemalari o'tishi uchun u o'rtasidan teng ikkiga bo'linib, uchlari 30° burchak ostida ko'tariladi. Ko'priklning ko'tarilgan uchlari suv sathidan qanday d balandlikda (m) joylashgan?



- A) 26
- B) 28
- C) 27
- D) 25