

Mavzu: Chiziqli funksiya : $y=ax+b$ uning xossalari va grafigi.

Kvadrat funksiya $y=ax^2+bx+c$ uning xossalari va grafigi.

$y = kx + b$ funksiya chiziqli funksiya deyiladi.

1. $x \in (-\infty; +\infty)$ mavjudlik (aniqlanish) sohasi.

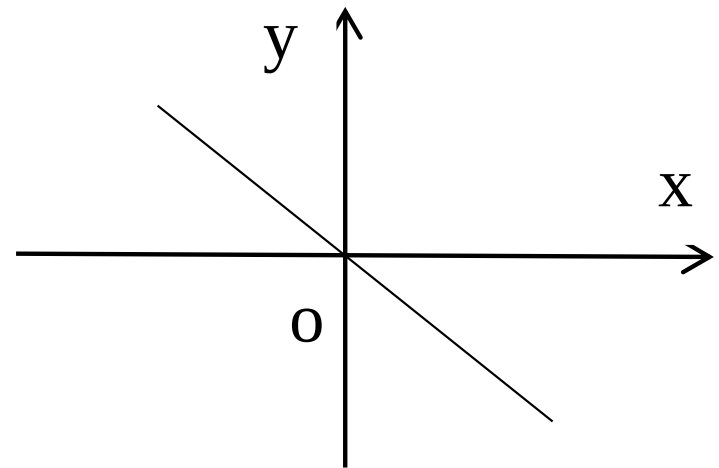
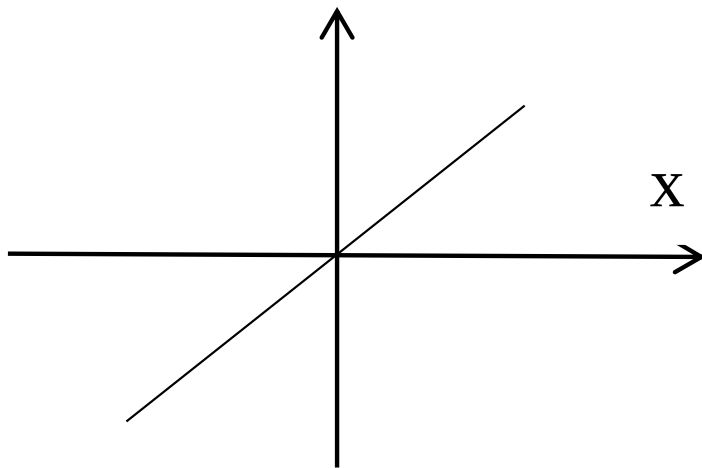
$y \in (-\infty; +\infty)$ qiymatlar (o'zgarish) sohasi.

2. $k > 0$ da o'suvchi, $k < 0$ da kamayuvchi, $x \in (-\infty; +\infty)$ da.

3. Chiziqli funksiya grafigi to'g'ri chiziqdan iborat.

4. $b = 0$; $k > 0$; $y = kx$

5. $b = 0$; $k < 0$; $y = kx$



6. $y = kx + b$ ga to'g'ri chiziqqa perpendikulyar va $M(x_0, y_0)$

nuqtadan o'tgan to'g'ri chiziq tenglamasi :

$$y - y_0 = -\frac{1}{k}(x - x_0) \quad (k_1 = -1/k \text{ perpendikulyarlik sharti})$$

7. . $y = kx + b$ ga to'g'ri chiziqqa parallel va $M(x_0, y_0)$ nuqtadan

o'tgan to'g'ri chiziq tenglamasi :

$$y - y_0 = k(x - x_0) \quad (k_1 = k \text{ parallellik sharti}).$$

1-misol. $M(2; -3)$ nuqtadan o'tuvchi va $y = 5x - 6$ to'g'ri chiziqqa parallel bo'lgan to'g'ri chiziq tenglamasini tuzamiz.

$M(x_1; y_1)$ va $N(x_2; y_2)$ nuqtalardan o'tuvchi to'g'ri chiziqlar tenglamasi

$$\frac{y-y_1}{y_2-y_1} = \frac{x-x_1}{x_2-x_1}.$$

Formula orqali topiladi.

2- m i s o l. $M(-2; -3)$ va $N(4; -1)$ nuqtalardan o'tuvchi to'g'ri chiziqning tenglamasini tuzamiz.

Kvadrat funksiya

$y = x^2$ funksiya

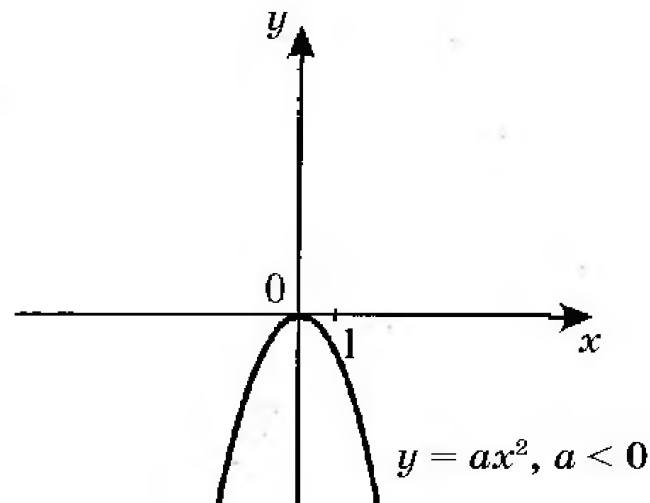
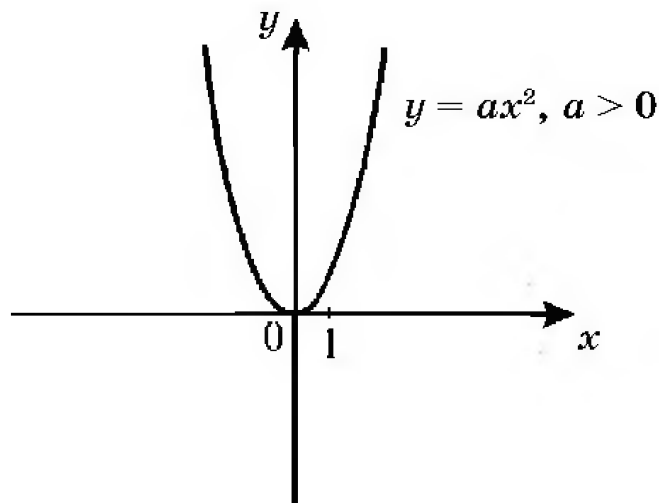
1. Aniqlanish (mavjudlik) sohasi $x \in (-\infty; \infty)$
2. Qiymatlar (o'zgarish) sohasi . $y \in [0; +\infty)$
3. $y = x^2$ juft funksiya.
4. Funksiya $(-\infty; 0]$ kamayuvchi, $[0; \infty)$ da o'suvchi.
5. $y = x^2$ juft funksiya grafigi parabola

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

Kvadrat funksiyaning umumiy ko'rinishi . a,b,c koeffitsiyentlar.

1. Aniqlanish (mavjudlik) sohasi $x \in (-\infty; \infty)$
2. Funksiya grafigi parabola , uchi $\left(-\frac{b}{2a}; \frac{4ac - b^2}{4a}\right)$ nuqtada yotadi .

$$x_0 = -\frac{b}{2a} ; y_0 = \frac{4ac - b^2}{4a} ;$$



1-masala. $y = x^2 - 4x + 3$ funksiyaning grafigini yasang.

Δ 1. Parabola uchining koordinatalarini hisoblaymiz:

$$x_0 = -\frac{-4}{2} = 2,$$

$$y_0 = 2^2 - 4 \cdot 2 + 3 = -1.$$

(2; -1) nuqtani yasaymiz.

2. (2; -1) nuqta orqali ordinatalar o'qiga parallel to'g'ri chiziq, ya'ni parabolaning simmetriya o'qini o'tkazamiz (13- a rasm).

3. Ushbu

$$x^2 - 4x + 3 = 0$$

tenglamani yechib, funksiyaning nollarini topamiz: $x_1 = 1$, $x_2 = 3$. (1; 0) va (3; 0) nuqtalarni yasaymiz (13- b rasm).

2- m a s a l a . $y = -2x^2 + 12x - 19$ funksiyaning grafigini yasang.

7.110. Koordinatalar boshi va M nuqta ustidan o'tuvchi to'g'ri chiziq tenglamasini tuzing:

a) $M(3; -4)$; b) $M(0; -3)$; d) $M(3; 0)$; e) $M(2; 5)$.

7.111. Chiziqli funksiylarning grafiklarini yasang:

a) $y = x - 2$; b) $y = -x + 3$; d) $y = 4x - 2$; e) $y = -2x - 5$.

7.112. $M(-2; 7)$ nuqtadan o'tuvchi va burchak koeffitsiyenti $k = 3$ bo'lgan to'g'ri chiziq tenglamasini tuzing va chizing.

7.113. M nuqtadan o'tuvchi va burchak koeffitsiyenti k bo'lgan to'g'ri chiziq tenglamasini tuzing:

a) $M(-2; -1)$, $k = 2$; b) $M(0; -4)$, $k = -3$;

d) $M(-1; -2)$, $k = \frac{1}{3}$; e) $M(5; 2)$, $k = \frac{1}{3}$.

7.114. $A(-4; 6)$ nuqtadan o'tib, $y = 3x + 5$ to'g'ri chiziqqa parallel bo'lgan to'g'ri chiziq tenglamasini tuzing.

35. Parabola uchining koordinatalarini toping:

1) $y = x^2 - 4x - 5$; 2) $y = x^2 + 3x + 5$;

3) $y = -x^2 - 2x + 5$; 4) $y = -x^2 + 5x - 1$.

36. Parabolaning koordinata o'qlari bilan kesishish nuqtalarini koordinatalarini toping:

1) $y = x^2 - 3x + 5$; 2) $y = -2x^2 - 8x + 10$;

3) $y = -2x^2 + 6$; 4) $y = 7x^2 + 14$.

Funksiyaning grafigini yasang va grafik bo'yicha: 1) x ning funksiya bo'yicha qabul qilishini aniqlang va ularni toping; 2) funksiya bo'yicha qabul qilishini aniqlang va ularni toping; 3) x ning qanday qiymatlarida funksiya eng katta yoki eng kichik qiymatlar qabul qilishini aniqlang va ularni toping (**37–38**).

37. 1) $y = x^2 - 7x + 10$;

2) $y = -x^2 + x + 2$;

3) $y = -x^2 + 6x - 9$;

4) $y = x^2 + 4x + 5$.

38. 1) $y = 4x^2 + 4x - 3$;

2) $y = -3x^2 - 2x + 1$;

3) $y = -2x^2 + 3x + 2$;

4) $y = 3x^2 - 8x + 4$;

5) $y = 4x^2 + 12x + 9$;

6) $y = -4x^2 + 4x - 1$;

7) $y = 2x^2 - 4x + 5$;

8) $y = -3x^2 - 6x - 4$.

50. Parabolaning koordinata o'qlari bilan kesishish nuqtalari koordinatalarini toping:

1) $y = x^2 + x - 12$;

2) $y = -x^2 + 3x + 10$;

3) $y = -8x^2 - 2x + 1$;

4) $y = 7x^2 + 4x - 11$;

5) $y = 5x^2 + x - 1$;

6) $y = 5x^2 + 3x - 2$;

7) $y = 4x^2 - 11x + 6$;

8) $y = 3x^2 + 13x - 10$.

51. Parabola uchining koordinatalarini toping:

1) $y = x^2 - 4x - 5$;

2) $y = -x^2 - 2x + 3$;

3) $y = x^2 - 6x + 10$;

4) $y = x^2 + x + \frac{5}{4}$;

5) $y = -2x(x + 2)$;

6) $y = (x - 2)(x + 3)$.

52. Funksiyaning grafigini yasang va grafik bo'yicha uning xossalari aniqlang:

1) $y = x^2 - 5x + 6$;

2) $y = x^2 + 10x + 30$;

3) $y = -x^2 - 6x - 8$;

4) $y = 2x^2 - 5x + 2$;

5) $y = -3x^2 - 3x + 1$;

6) $y = -2x^2 - 3x - 3$.