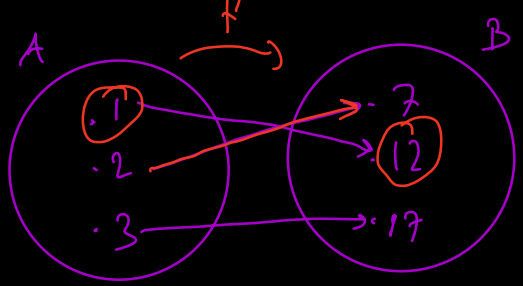
FONKSİYON

① $f: A \to B$

Tanım ↙ ↘ Görüntü



$f(1) = 12$

$f(2) = 7$

$f(3) = 17$

② $f(x) = 2x + 4$

$f(5) = 2 \cdot 5 + 4$

$= 10 + 4 = 14$

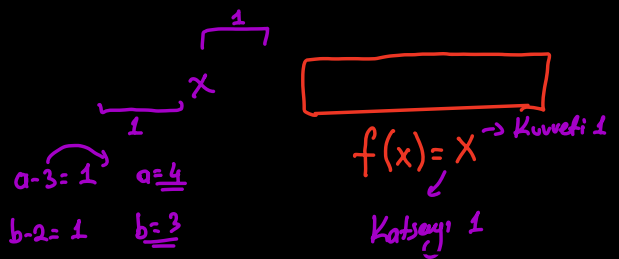
$f(x) = \frac{x+3}{2}$

$f(7) = \frac{7+3}{2}$

$= 5$

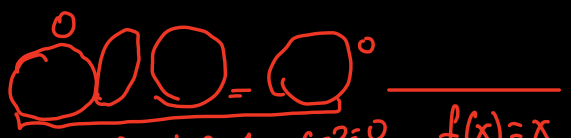
③ Ali sınıfta 20 soru çözüyor. Ali'nin toplam çözdüğü soru sayısını fonksiyon olarak gösteriniz

$f(x) = 20$



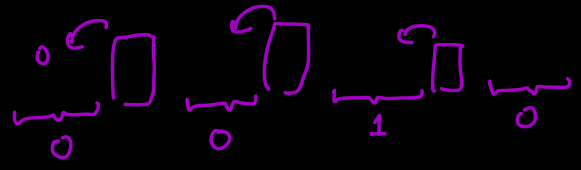
a-3=1 a=4

b-2=1 b=3



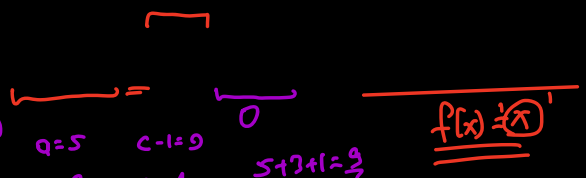
a-2=0 b-3=1 c-2=0

a=2 b=4 c=2



a+3=0 b-2=0 c+1=1 d+4=0

a=-3 b=2 c=0 d=-4



a-4=1 a=5 c-1=0 5+3+1=9

b-2=1 b=3 c=1

2a+4=0 3b-6=0 c-3=1 d+2=0

a=-2 3b=6 c=4 d=-2

b=2

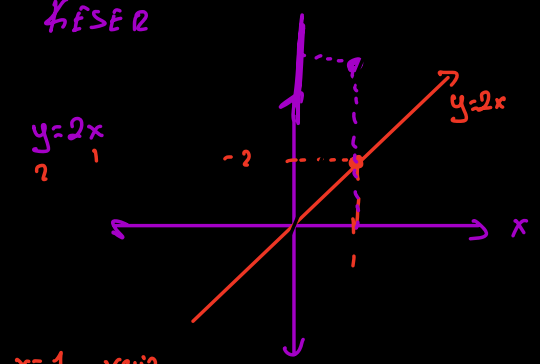
KOORDİNAT

f(x)

$y = ax + b$ veya f(x) $y = ax$ doğruların grafiği.

Sabit terim varsa EKSENLERİ KESER

Sabit terim yoksa orijinden geçer.



x=1 verip y=?

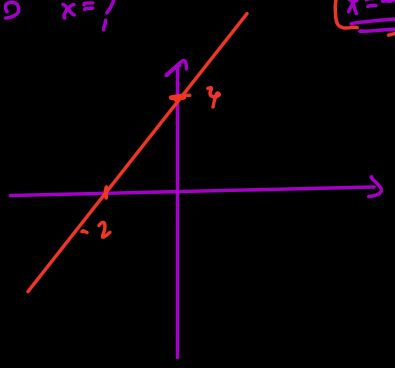
Eksen kesen

x=0 y=?

y=0 x=?

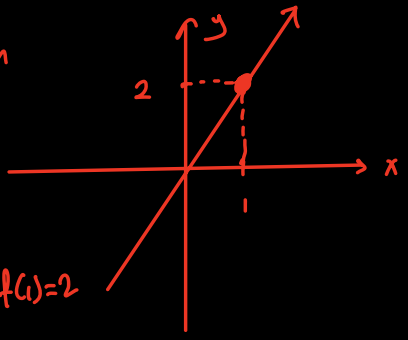
x=0 y=2.0+4 y=4

y=0 0=2x+4 -4=2x x=-2



Örn: f(x)=2x 'in grafiği?

Orijinden

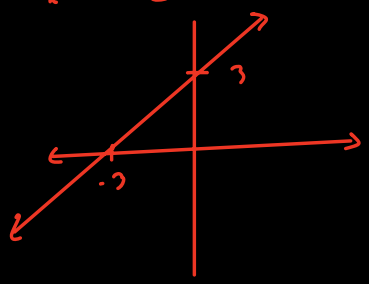


x=1 f(1)=2

Örn: f(x)=x+3 grafiği?

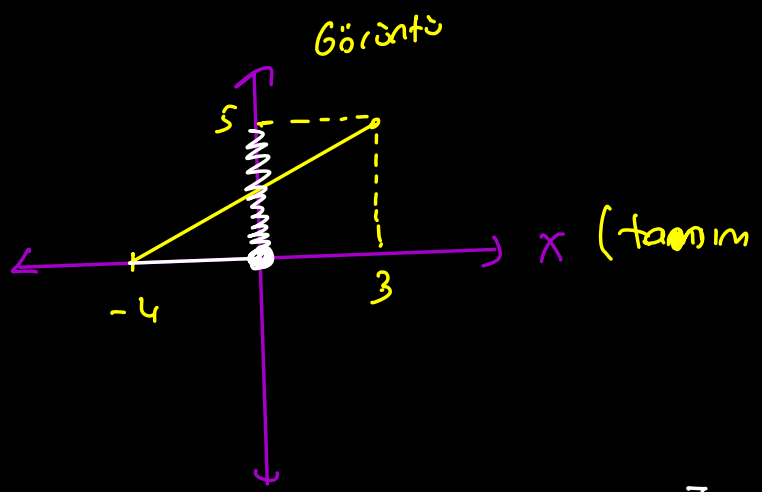
y=0 x+3=0 x=-3

x=0 y=0+3 y=3

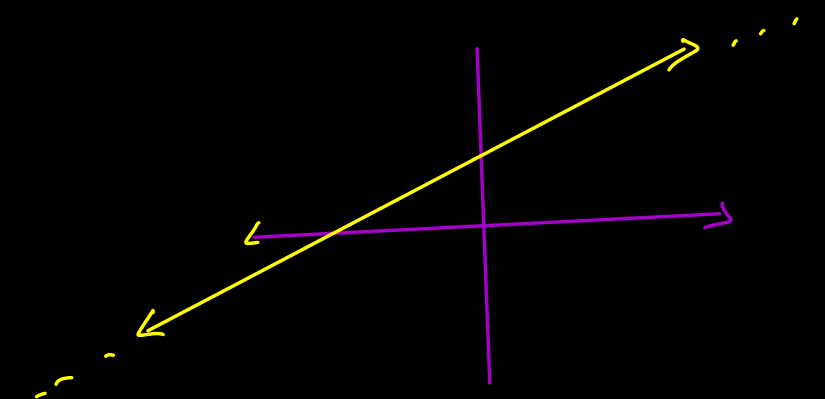


X
TANIM

y
GÖRÜNTÜ



Tanım $[-4, 3]$ Görüntü $[0, 5]$



Tanım → $(-\infty, \infty)$ Görüntü $(-\infty, \infty)$

Örn $f: [2, 8) \to B$ $f(x) = 2x$ ise Görüntü?

tanım x'in değerleri — Görüntü — y

$f(2) = 4$

$f(8) = 16$

$[4, 16)$

Örn: $f: [-2, 4) \to B$ — Tanım

$f(x) = 3x$

$f(-2) = -6$

$f(4) = 12$

Görüntü? $[-6, 12)$

Örn: $f: (2, 10) \to B$

$f(x) = x + 7$

$f(2) = 9$

$f(10) = 17$

Görüntü? $(9, 17)$

Örn: $f: A \to [3, 10)$

$f(x) = \frac{x+1}{3}$

$x+1=3 \quad x=2$

$x+1=10 \quad x=9$

Tanım? $[2, 9)$

Örn: $f: (2, 8] \to B$

$f(x) = 2x - 3$

$f(2) = 1$

$f(8) = 13$

Görüntü? $(1, 13]$

Örn: $f: A \to [1, 18]$

$f(x) = \frac{2x+3}{1}$

$2x+3=18 \quad \frac{2x}{2} = \frac{15}{2} \quad x = \frac{15}{2}$

$2x+3=1 \quad 2x=-2 \quad x=-1$

Tanım? $[-1, \frac{15}{2}]$

- $f(x) = x$
- Grafik
- Tanım
  Değer
- Artan - Azalan ✓
- Sabit ✓
- Doğrusal - Parçalı

Bir fonksiyonda x artarken sonuçta
Artıyorsa ARTAN , x artarken
sonuç azalıyorsa AZALAN

$f(x) = 3x + 4$ $\quad f(1) = 7 \downarrow \quad f(2) = 10$ ARTAN ✓

$f(x) = -2x + 3$ $\quad f(1) = 1 \downarrow \quad f(2) = -1$ AZALAN ✓

Referans (Doğrusal)
- Fonksiyonda $\quad f(x) = ax + b$

Eğim

$y = 3x + 2$

Eğim > 0 artan
Eğim < 0 azalan

Sabit Fonk

Verilen her değer için aynı sonuca giden fonksiyon.

Yani içinde x olmayan.

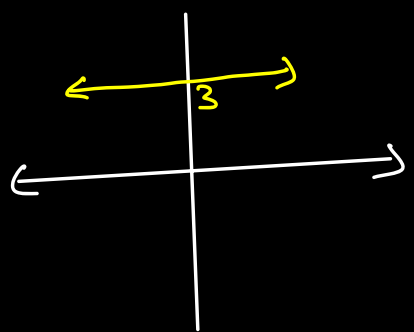
$f(x)=3$

$f(1)=3$

$f(2)=3$

$f(3)=3$

$f(99)=3$



Soruda sabit dese x'li terimlerin katsayı veya kuvveti 0 olmalı.

$f(x)=(a-2)x^2+x^{(b-3)}+4$

Sabit fonk. ise

$a=?$ $a-2=0$ $\underline{a=2}$

$b=?$ $b-3=0$ $\underline{b=3}$

DOĞRUSAL FONK

$f(x) = ax + b$ şeklinde tanımlanan fonk. $x^2, x^3, \dots$ terimler yok.

$f(x) = 3x^2 + 4x + 6$ Doğrusal DEĞİL

$f(x) = (a-2)x^2 + 4x + 6$ Doğrusal ise $a = ?$

$a - 2 = 0$ $\quad a = 2$

(11) Rw) $f: A \to B$ doğrusal fonksiyon. $\Rightarrow f(x) = ax + b$

$f(2) = 10$

$f(6) = 16$ ise $f(10) = ?$

$f(2) = 2a + b = 10$

$f(6) = 6a + b = 16$

$-4a = -6$

$a = \frac{-6}{-4} = \frac{3}{2}$ //

$2 \cdot \frac{3}{2} + b = 10$

$3 + b = 10$

$b = 7$

$f(x) = \frac{3}{2} \cdot x + 7$

$f(10) = \frac{3}{2} \cdot 10 + 7$

$= 15 + 7$

$= 22$

i) $f: A \to B$ doğrusal fonk. $\longrightarrow f(x) = ax + b$

$f(1) = 12$

$f(3) = 16$

ise $f(9) = ?$

$x = 1 \quad f(1) = a \cdot 1 + b = 12$

$x = 3 \quad f(3) = a \cdot 3 + b = 16$

$a + b = 12$

$-\ 3a + b = 16$

$-2a = -4$

$a = 2$

$2 + b = 12$

$b = 10$

$\star\ f(x) = 2 \cdot x + 10$

$f(9) = 2 \cdot 9 + 10$

$= 18 + 10$

$= 28$

ii) $f: A \to B$ doğrusal fonk. $f(x) = ax + b$

$f(2) = 12$

$f(7) = 32$

ise $f(10) = ?$

$2a + b = 12$

$-\ 7a + b = 32$

$-5a = -20$

$a = 4$

$2 \cdot 4 + b = 12$

$8 + b = 12$

$b = 4$

$f(10) = 4 \cdot 10 + 4$

$= 44$

Gizli DOĞRUSAL

(..RN) $f(x)+f(x+1)=4x+5$ ise $f(2)=?$

$f(x)=ax+b$

$f(x+1)=a\cdot(x+1)+b$

$=ax+a+b$

$ax+b+ax+a+b=4x+5$

$2ax+2b+a=4x+5$

$2a=4$, $2b+a=5$

$a=2$

$2b+2=5$

$2b=3$

$b=\frac{3}{2}$

(*) $f(x)=2x+\frac{3}{2}$

$f(2)=2\cdot 2+\frac{3}{2}$

$=4+\frac{3}{2}=\frac{11}{2}$ //

DOĞRUSAL OLMA ŞARTI

(..Rş) $f:A\to B$ doğrusal $\Rightarrow f(x)=ax+b$ (x^1)

x^2, x^3 terim olmayacak

$f(x)=(a-2)x^2+3x^{(b-1)}+4$ doğrusal ise $a=?$ $b=?$

x^1'in kuvveti 1 $x^2, x^3, \dots$ olmalı!

$a-2=0$ $\quad$ $b-1=1$

$a=2$ $\quad$ $b=2$

Örn: $f: A \to B$ doğrusal fonksiyon

$f(x) = \underbrace{(2a-4)}_{0} x^3 + \underbrace{(b-2)}_{0} x^2 + 3x^{\overbrace{c+2}^{1}}$ ise $a+b+c = ?$

$2a-4=0$ $\quad b-2=0$ $\quad c+2=1$ $\quad 2+2+(-1) = \underline{\underline{3}}$

$\underline{\underline{a=2}}$ $\quad \underline{\underline{b=2}}$ $\quad \underline{\underline{c=-1}}$

Örn: $f: A \to B$ doğrusal fonksiyon $\to \underline{f(x) = ax+b}$

$f(4) = 12$

$f(6) = 20$ ise $f(\underline{\underline{10}}) = ?$

$$\begin{array}{r} 4a+b=12 \\ -\ 6a+b=20 \\ \hline -2a=-8 \end{array}$$

$\underline{\underline{a=4}}$

$4 \cdot 4 + b = 12$

$16 + b = 12$

$\underline{\underline{b=-4}}$

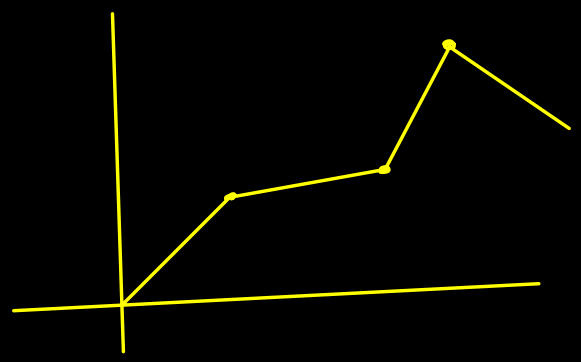
$f(x) = 4x-4$

$f(10) = 40-4$

$= \underline{\underline{36}}$

PARÇALI FONK

$$f(x)=\begin{cases} \text{-----} & x<a \\ \text{----}, & a\le x<b \\ \text{----}, & b\le x \end{cases}$$



(11/2) $$f(x)=\begin{cases} 3x+2 & , \ x<10 \\ 4 & , \ 10\le x<20 \\ 2x+5 & , \ 20\le x \end{cases}$$

Buna göre $f(8)=3\cdot 8+2=24+2=26$

$f(10)=4$

$f(19)=4$

$f(20)=2\cdot 20+5=45$

$f(25)=2\cdot 25+5=55$