

28-Мавзу. Функцияни тўлиқ текшириш.

1 mlrd. so'm miqdoridagi kapital bankkga yiliga 50 % foydaga qo'yilishi yoki daromadidan $p\%$ nalog olinadigan ishlab chiqarishga 100 % foydaga ijaraga berilishi mumkin. p ning qanday qiymatlarida kapitalni ishlab chiqarishga berish bankda saqlashdan foydaliroq bo'ladi?

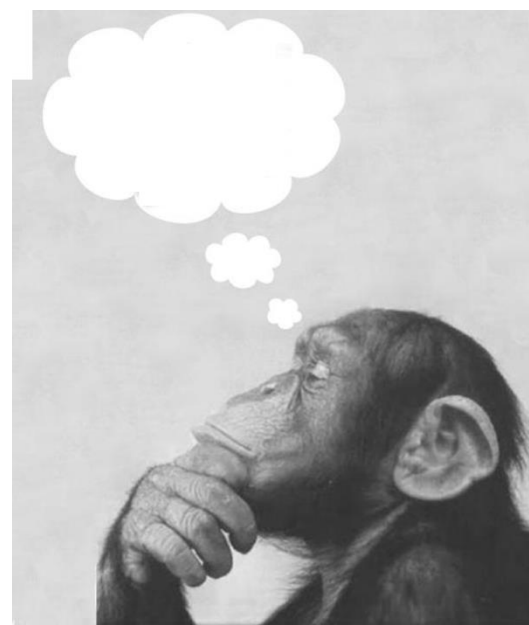
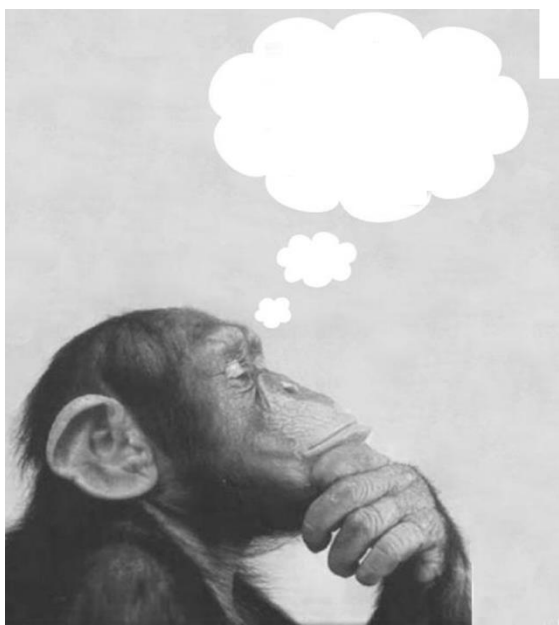


Echish.



Faraz qilaylik, kapitalning x qismi ishlab chiqarishga ijaraga, $(1-x)$ qismi bankga qo'yilsin. Bir yildan so'ng bankdagi capital

$(1-x) \cdot (1 + 500/1000) = 3/2 - 3/2x$, ishlab chiqarishga ajratilgan capital esa $2x$ bo'ladi, lekin unda sarf-xarajat $\alpha \cdot x^2$ ko'rinishda bo'lsa, foyda $2x - \alpha \cdot x^2$ bo'lib, undan $(2x - \alpha \cdot x^2) \cdot (p/100)$ qismi nalogga ketadi, sof daromad $(1 - (p/100)) \cdot (2x - (\alpha \cdot x^2))$ ko'rinishda bo'ladi.



Demak, 1 yildan so'ng kapital

$$y(x) = \frac{3}{2} - \frac{3}{2}x + \left(1 - \frac{p}{100}\right)(2x - \alpha x^2) = \frac{3}{2} + \left[2\left(1 - \frac{p}{100}\right) - \frac{3}{2}\right]x - \alpha\left(1 - \frac{p}{100}\right)x^2$$

miqdorida
bo'ladi.

Uning $[0;1]$

Kesmadagi

Maksimal

qiymatini

topish zarur.



$$y'(x) = 2 \left(1 - \frac{p}{100}\right) - \frac{3}{2} - 2\alpha \left(1 - \frac{p}{100}\right)x = 0$$

dan kritik nuqta

$$x_0 = \frac{2 \left(1 - \frac{p}{100}\right) - \frac{3}{2}}{2\alpha \left(1 - \frac{p}{100}\right)}$$

kelib chiqadi.

$$y''(x) = -2\alpha \left(1 - \frac{p}{100}\right) < 0$$

ekanligi, 2-qoidaga ko'ra, topilgan x_0 nuqtada maksimum bor ekanligini bildiradi. Uning $[0;1]$ kesmaαaga tegishli bo'lishidan

$$0 < 2 \left(1 - \frac{p}{100} \right) - \frac{3}{2} < 1$$

yoki $p < 25$ ekanligini topamiz .

Shunday qilib , $p > 25$ bo'lsa , mablag'ni bankka qo'yish , $p < 25$ da ishlab chiqarishga berishi maqul.

$$Y(x_0) = \frac{3}{2} + \frac{\left[2 \left(1 - \frac{p}{100} \right) - \frac{3}{2} \right]^2}{4\alpha \left(1 - \frac{p}{100} \right)} > \frac{3}{2} = y(0).$$

E'tiboringiz uchun
raxmat!

