

Constraint Bourd Optimization - Single Constraint: Revenue function R(x, + x2, x3) = 50 \(\frac{1}{2} \), + 40 \(\frac{1}{2} \) + 30 \(\frac{1}{2} \) 7: budget for Spent on Facebook Ads.

7: budget spent on Facebook Ads.

7: budget spent on Linked In Ads. we wind to maximize $R(x_1, x_2, x_3)$ total budget constraint: 9ND : Men : $\chi_{1} + \chi_{2} + \chi_{3} = 100,000 \cdot 2.11 = 100 \cdot 10.11 \cdot 100 \cdot 1$ $(\pi_{11}\pi_{21}\pi_{31}) = 50\sqrt{\pi_1} + 40\sqrt{\pi_2} + 30\sqrt{\pi_3}$ + A(100000 - 7, -x2-x3) 100 211 = [10] 10 911, marin

Date: / /
Page:

Partial Derryatives:

$$\frac{\partial L}{\partial x_1} = \frac{50}{2\sqrt{x_1}} - \frac{\partial}{\partial x_2} = 0$$

$$\Rightarrow \sqrt{\chi} = 50 \Rightarrow \chi_1 = 50^2 = (25)^2$$

$$2\lambda = 2\lambda$$

$$\frac{\partial L}{\partial \gamma_2} = \frac{4D}{2\sqrt{\gamma_2}} - \lambda = 0$$

$$\Rightarrow \sqrt{\chi_2} = 40 \Rightarrow \chi_2 = 20$$

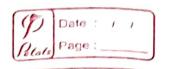
$$0 \frac{\partial L}{\partial x_3} = \frac{30}{2} \sqrt{x_3}$$

$$\Rightarrow 30 = \sqrt{x_3} \Rightarrow x_3 = \left(\frac{15}{2}\right)^2$$

$$\Rightarrow \left(\frac{25}{2}\right)^2 + \left(\frac{20}{2}\right)^2 + \left(\frac{15}{2}\right)^2 = 100,000$$

$$\Rightarrow 625 + 400 + 225 = 100000$$

$$\frac{1}{2} = \frac{100000}{1}$$



$$\Rightarrow 1250 = 100000$$

$$\Rightarrow \lambda^{2} = 1250$$

$$\Rightarrow \lambda^{2} = 1250$$

$$\Rightarrow \lambda^2 = 1250$$

$$100000$$

$$\Rightarrow 3^2 = 1$$
80

$$\Rightarrow \lambda = 1 \approx 0.118$$

Compute Optimal Values:

$$x_1 = (25)^2 = (25)^2 \sim (223.7)^2 = 5,0000$$

$$\chi_{2} = (20)^{2} = (20)^{2} \approx (178.9)^{2} = 32000$$

$$T_3 = \begin{pmatrix} 15 \end{pmatrix}^2 = \begin{pmatrix} 15 \end{pmatrix}^2 = \begin{pmatrix} 15 \end{pmatrix}^2 = \begin{pmatrix} 134.2 \end{pmatrix}^2 = 18000$$

Verify the solution.

 $\chi_1 + \gamma_2 + \chi_3 = 50000 + 32000 + 18000 = 100000$

i .			
Optimal solution	most	likelyis	
$\chi_1 = 50000$			
72 - 32000			
72 = 18000			

The company should allocate the budget as follows

Guogole Ady - 50,000

Facebook Ads - 32,000

Linked Tr Ads - 18,000