**lpm**

Factory makes five types of products chettos on which its profit is $15 todo on which its profit is $75, hohos on which its profit is $10,twinkes on which its profit is20 bikrols on which its profit is $30. Each type requires color flavor calories sugar fat

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | cheetos | todo | hohos | Twiniks | bikrols | Available |
| Color | 2 | 3 | 1 | 2 | 1 | 180 |
| Flavour | 3 | 1 | 4 | 2 | 1 | 100 |
| Calories | 2 | 2 | 3 | 1 | 1 | 120 |
| Sugar | 4 | 4 | 2 | 3 | 2 | 210 |
| Fat | 2 | 1 | 1 | 2 | 3 | 260 |
| Profit/Unit | 15 | 75 | 10 | 20 | 30 |  |

The company can obtain a regular weekly supply of only 180 100 120 210 260 of working hours. How many calculators of each type should be made each week in order to maximize the total profit?

**Solution**

Let **x1** be the number of produced units of chetos

Let **x2** be the number of produced units of todo

Let **x3** be the number of produced units of hohos

Let **x4** be the number of produced units of twinkes

Let **x5** be the number of produced units of bikrols

Max

15x1+75x2+10x3+20x3+20x4+30x5

2X1+ 3x2+ 1x3+2 x4+1 x5 ≤ 180

3x1 + 1 x2 + 4 x3 +2 x4 + 1 x5 ≤ 100

**2**x1 + 2x2 + 3x3 + 1 x4 + 1xx5 ≤ 12o

4x1 + 4 x2 + 2 x3 + 3x4 + 2x5 ≤ 210

2x1+1x2+1x3+2x4++3x5<250

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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|  |  |  |  |  |  |  |  |  |  |
|  |  | **Final** | **Reduced** | **Objective** | **Allowable** | **Allowable** |  |  |  |
| **Cell** | **Name** | **Value** | **Cost** | **Coefficient** | **Increase** | **Decrease** |  |  |  |
| $B$12 | Units Produced cheetos | 0 | -17 | 15 | 17 | 1E+30 |  |  |  |
| $C$12 | Units Produced todo | 11 | 0 | 25 | 35 | 15 |  |  |  |
| $D$12 | Units Produced hohos | 0 | -6 | 10 | 6 | 1E+30 |  |  |  |
| $E$12 | Units Produced twiniks | 0 | -7.5 | 20 | 7.5 | 1E+30 |  |  |  |
| $F$12 | Units Produced bikrols | 83 | 0 | 30 | 45 | 15 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  | **Final** | **Shadow** | **Constraint** | **Allowable** | **Allowable** |  |  |  |
| **Cell** | **Name** | **Value** | **Price** | **R.H. Side** | **Increase** | **Decrease** |  |  |  |
| $B$17 | Color Quantity(LHS) | 116 | 0 | 180 | 1E+30 | 64 |  |  |  |
| $B$18 | Flavour Quantity(LHS) | 94 | 0 | 100 | 1E+30 | 6 |  |  |  |
| $B$19 | Calories Quantity(LHS) | 105 | 0 | 120 | 1E+30 | 15 |  |  |  |
| $B$20 | Sugar Quantity(LHS) | 210 | 4.5 | 210 | 30 | 36.66666667 |  |  |  |
| $B$21 | Fat Quantity(LHS) | 260 | 7 | 260 | 30 | 207.5 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Range of optimaliyy |  |  |  |  |  |  |  |  |  |
| 25+35 = 60  25-15= 10  15+17= 22  15-infinty= infinity  10+6=16  10-infinty= imfimty  20+7.5=27.5  20nfinty+infinty  30+45= 65  30\_15=15 |  |  |  |  |  |  |  |  |  |

**Binding or not**

1-Not Binding

2not -Binding

3-Not Binding

4-binding

5-binding

**6-Shadow Price**

1-The Shadow Price = 0, There Is No Change

2-The Shadow Price will not change

3-The Shadow Price = 0, No Change

4-The Shadow Price = 7.4, When the R.H.S Increase By One the Profit Increase

5-The Shadow Price = 4.5, When the R.H.S Increase by One the Profit Increase

Increase profit of bikrols to 40what will happen

it will still optimal 40 inside the range



Increase PROFIT OF BIKROLS TO BE 80

It will change not be optimal it will be out of the range



***Or project***

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aya reda kmal 1314683

Nouran khaled gamal 1314645

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