

LINEAR PROGRAMMING PROBLEM

MAX $4645.9x_{13} + 4645.9x_{14} + 4645.9x_{15} + 4645.9x_{16} + 3206.76x_{17} + 3206.76x_{18} + 3206.76x_{19} + 3206.76x_{20} + 402.26x_{21} + 2071.98x_{22}$

S.T.

- 1) $1x_1 + 1x_{17} + 1x_{19} + 1x_{21} = 100$
- 2) $1x_2 + 1x_{13} + 1x_{15} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} + 1x_{21} = 100$
- 3) $1x_3 + 1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} + 1x_{21} = 100$
- 4) $1x_4 + 1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} = 100$
- 5) $1x_5 + 1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} = 100$
- 6) $1x_6 + 1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} = 100$
- 7) $1x_7 + 1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} + 1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} + 1x_{22} = 100$
- 8) $1x_8 + 1x_{14} + 1x_{15} + 1x_{18} + 1x_{19} + 1x_{22} = 100$
- 9) $1x_9 + 1x_{22} = 100$
- 10) $1x_{10} + 1x_{22} = 100$
- 11) $1x_{11} + 1x_{20} + 1x_{21} + 1x_{22} = 100$
- 12) $1x_{12} + 1x_{20} + 1x_{21} + 1x_{22} < 30$
- 13) $1x_{13} + 1x_{14} + 1x_{15} + 1x_{16} < 40$
- 14) $1x_{17} + 1x_{18} + 1x_{19} + 1x_{20} < 60$
- 15) $1x_{21} < 40$
- 16) $1x_{22} < 0$
- 17) $1x_1 > 0$
- 18) $1x_2 > 0$
- 19) $1x_3 > 0$
- 20) $1x_4 > 0$
- 21) $1x_5 > 0$
- 22) $1x_6 > 0$
- 23) $1x_7 > 0$
- 24) $1x_8 > 0$
- 25) $1x_9 > 0$
- 26) $1x_{10} > 0$
- 27) $1x_{11} > 0$
- 28) $1x_{12} > 0$
- 29) $1x_{13} > 0$
- 30) $1x_{14} > 0$
- 31) $1x_{15} > 0$
- 32) $1x_{16} > 0$
- 33) $1x_{17} > 0$
- 34) $1x_{18} > 0$
- 35) $1x_{19} > 0$
- 36) $1x_{20} > 0$
- 37) $1x_{21} > 0$
- 38) $1x_{22} > 0$

OPTIMAL SOLUTION

Objective Function Value = 378241.600

| Variable | Value | Reduced Costs |
|----------|---------|---------------|
| ----- | ----- | ----- |
| X1 | 40.000 | 0.000 |
| X2 | 0.000 | 0.000 |
| X3 | 0.000 | 0.000 |
| X4 | 0.000 | 0.000 |
| X5 | 0.000 | 0.000 |
| X6 | 0.000 | 0.000 |
| X7 | 0.000 | 0.000 |
| X8 | 0.000 | 0.000 |
| X9 | 100.000 | 0.000 |
| X10 | 100.000 | 0.000 |
| X11 | 100.000 | 0.000 |
| X12 | 0.000 | 0.000 |
| X13 | 0.000 | 0.000 |
| X14 | 0.000 | 0.000 |
| X15 | 40.000 | 0.000 |
| X16 | 0.000 | 0.000 |
| X17 | 0.000 | 0.000 |
| X18 | 0.000 | 0.000 |
| X19 | 60.000 | 0.000 |
| X20 | 0.000 | 0.000 |
| X21 | 0.000 | 0.000 |
| X22 | 0.000 | 0.000 |

| Constraint | Slack/Surplus | Dual Prices |
|------------|---------------|-------------|
| 1 | 0.000 | 0.000 |
| 2 | 0.000 | 0.000 |
| 3 | 0.000 | 402.260 |
| 4 | 0.000 | 0.000 |
| 5 | 0.000 | 0.000 |
| 6 | 0.000 | 0.000 |
| 7 | 0.000 | 0.000 |
| 8 | 0.000 | 0.000 |
| 9 | 0.000 | 0.000 |
| 10 | 0.000 | 0.000 |
| 11 | 0.000 | 0.000 |
| 12 | 30.000 | 0.000 |
| 13 | 0.000 | 4243.640 |
| 14 | 0.000 | 2804.500 |
| 15 | 40.000 | 0.000 |
| 16 | 0.000 | 2071.980 |
| 17 | 40.000 | 0.000 |
| 18 | 0.000 | 0.000 |
| 19 | 0.000 | -402.260 |
| 20 | 0.000 | 0.000 |
| 21 | 0.000 | 0.000 |
| 22 | 0.000 | 0.000 |
| 23 | 0.000 | 0.000 |
| 24 | 0.000 | 0.000 |
| 25 | 100.000 | 0.000 |
| 26 | 100.000 | 0.000 |
| 27 | 100.000 | 0.000 |
| 28 | 0.000 | 0.000 |
| 29 | 0.000 | 0.000 |
| 30 | 0.000 | 0.000 |
| 31 | 40.000 | 0.000 |
| 32 | 0.000 | 0.000 |
| 33 | 0.000 | 0.000 |
| 34 | 0.000 | 0.000 |
| 35 | 60.000 | 0.000 |
| 36 | 0.000 | 0.000 |
| 37 | 0.000 | 0.000 |
| 38 | 0.000 | 0.000 |

OBJECTIVE COEFFICIENT RANGES

| Variable | Lower Limit | Current Value | Upper Limit |
|----------|----------------|---------------|----------------|
| X1 | -4243.640 | 0.000 | 0.000 |
| X2 | No Lower Limit | 0.000 | 0.000 |
| X3 | No Lower Limit | 0.000 | 402.260 |
| X4 | No Lower Limit | 0.000 | 2804.500 |
| X5 | No Lower Limit | 0.000 | 2804.500 |
| X6 | No Lower Limit | 0.000 | 2804.500 |
| X7 | No Lower Limit | 0.000 | 2071.980 |
| X8 | No Lower Limit | 0.000 | 0.000 |
| X9 | No Lower Limit | 0.000 | 2071.980 |
| X10 | No Lower Limit | 0.000 | 2071.980 |
| X11 | 0.000 | 0.000 | 402.260 |
| X12 | No Lower Limit | 0.000 | 0.000 |
| X13 | No Lower Limit | 4645.900 | 4645.900 |
| X14 | No Lower Limit | 4645.900 | 4645.900 |
| X15 | 4645.900 | 4645.900 | No Upper Limit |
| X16 | No Lower Limit | 4645.900 | 4645.900 |
| X17 | No Lower Limit | 3206.760 | 3206.760 |
| X18 | No Lower Limit | 3206.760 | 3206.760 |
| X19 | 3206.760 | 3206.760 | No Upper Limit |
| X20 | No Lower Limit | 3206.760 | 3206.760 |
| X21 | 0.000 | 402.260 | 3206.760 |
| X22 | 0.000 | 2071.980 | No Upper Limit |

RIGHT HAND SIDE RANGES

| Constraint | Lower Limit | | Current Value | Upper Limit |
|------------|----------------|---------|---------------|----------------|
| ----- | ----- | | ----- | ----- |
| 1 | | 60.000 | 100.000 | No Upper Limit |
| 2 | | 100.000 | 100.000 | No Upper Limit |
| 3 | | 100.000 | 100.000 | 100.000 |
| 4 | | 100.000 | 100.000 | No Upper Limit |
| 5 | | 100.000 | 100.000 | No Upper Limit |
| 6 | | 100.000 | 100.000 | No Upper Limit |
| 7 | | 100.000 | 100.000 | No Upper Limit |
| 8 | | 100.000 | 100.000 | No Upper Limit |
| 9 | | 0.000 | 100.000 | No Upper Limit |
| 10 | | 0.000 | 100.000 | No Upper Limit |
| 11 | | 0.000 | 100.000 | No Upper Limit |
| 12 | | 0.000 | 30.000 | No Upper Limit |
| 13 | | 10.000 | 40.000 | 40.000 |
| 14 | | 30.000 | 60.000 | 60.000 |
| 15 | | 0.000 | 40.000 | No Upper Limit |
| 16 | | 0.000 | 0.000 | 0.000 |
| 17 | No Lower Limit | | 0.000 | 40.000 |
| 18 | No Lower Limit | | 0.000 | 0.000 |
| 19 | | 0.000 | 0.000 | 0.000 |
| 20 | No Lower Limit | | 0.000 | 0.000 |
| 21 | No Lower Limit | | 0.000 | 0.000 |
| 22 | No Lower Limit | | 0.000 | 0.000 |
| 23 | No Lower Limit | | 0.000 | 0.000 |
| 24 | No Lower Limit | | 0.000 | 0.000 |
| 25 | No Lower Limit | | 0.000 | 100.000 |
| 26 | No Lower Limit | | 0.000 | 100.000 |
| 27 | No Lower Limit | | 0.000 | 100.000 |
| 28 | | 0.000 | 0.000 | 30.000 |
| 29 | No Lower Limit | | 0.000 | 0.000 |
| 30 | | 0.000 | 0.000 | 40.000 |
| 31 | No Lower Limit | | 0.000 | 40.000 |
| 32 | | 0.000 | 0.000 | 40.000 |
| 33 | | 0.000 | 0.000 | 60.000 |
| 34 | | 0.000 | 0.000 | 60.000 |
| 35 | No Lower Limit | | 0.000 | 60.000 |
| 36 | | 0.000 | 0.000 | 30.000 |
| 37 | No Lower Limit | | 0.000 | 0.000 |
| 38 | No Lower Limit | | 0.000 | 0.000 |