Merton Truck Problem 1

		Production Amounts	
		Model 101	Model 102
	Quantity Prod	1500	1500
Sales price per Unit:		$ 39,000.00	$ 38,000.00
Costs:	Materials	$ 24,000.00	$ 20,000.00
	Labor	$ 4,000.00	$ 4,500.00
	Variable Overl	$ 8,000.00	$ 8,500.00
Contribution/Unit:		$ 3,000.00	$ 5,000.00
Total Contribution (Objective):			$ 12,000,000.00

				LHS Equatic	RHS Limit
Constraints:	Engine	1	2	4500	4500
	Stamping	2	2	6000	6000
	101 Assembly	2	0	3000	5000
	102 Assembly	0	3	4500	4500

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_1
Report Created: 7/22/2018 9:52:56 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: Simplex LP
Solution Time: 0.016 Seconds.
Iterations: 3 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$D$12	Total Contribution (Objective): Model 102	$ -	$ 11,000,000.00

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	0	2000	Contin
$D$6	Quantity Produced Model 102	0	1000	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$15	Engine LHS Equation	4000	$E$15<=$F$15	Binding	0
$E$16	Stamping LHS Equation	6000	$E$16<=$F$16	Binding	0
$E$17	101 Assembly LHS Equation	4000	$E$17<=$F$17	Not Binding	1000
$E$18	102 Assembly LHS Equation	3000	$E$18<=$F$18	Not Binding	1500

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_1
Report Created: 7/22/2018 9:57:15 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: Simplex LP
Solution Time: 0.031 Seconds.
Iterations: 3 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$D$12	Total Contribution (Objective): Model 102	$ 11,000,000.00	$ 11,002,000.00

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	2000	1999	Contin
$D$6	Quantity Produced Model 102	1000	1001	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$15	Engine LHS Equation	4001	$E$15<=$F$15	Binding	0
$E$16	Stamping LHS Equation	6000	$E$16<=$F$16	Binding	0
$E$17	101 Assembly LHS Equation	3998	$E$17<=$F$17	Not Binding	1002
$E$18	102 Assembly LHS Equation	3003	$E$18<=$F$18	Not Binding	1497

Microsoft Excel 16.0 Sensitivity Report
Worksheet: [Book1]MT_1
Report Created: 7/22/2018 9:55:00 PM

Variable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
$C$6	Quantity Produced Model 101	2000	0	3000	2000	500
$D$6	Quantity Produced Model 102	1000	0	5000	1000	2000

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
$E$15	Engine LHS Equation	4000	2000	4000	500	500
$E$16	Stamping LHS Equation	6000	500	6000	500	1000
$E$17	101 Assembly LHS Equation	4000	0	5000	1E+30	1000
$E$18	102 Assembly LHS Equation	3000	0	4500	1E+30	1500

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_1
Report Created: 7/22/2018 9:58:10 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: Simplex LP
Solution Time: 0.031 Seconds.
Iterations: 3 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$D$12	Total Contribution (Objective): Model 102	$ 11,002,000.00	$ 11,200,000.00

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	1999	1900	Contin
$D$6	Quantity Produced Model 102	1001	1100	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$15	Engine LHS Equation	4100	$E$15<=$F$15	Binding	0
$E$16	Stamping LHS Equation	6000	$E$16<=$F$16	Binding	0
$E$17	101 Assembly LHS Equation	3800	$E$17<=$F$17	Not Binding	1200
$E$18	102 Assembly LHS Equation	3300	$E$18<=$F$18	Not Binding	1200

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_1
Report Created: 7/22/2018 9:59:54 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: Simplex LP
Solution Time: 0.031 Seconds.
Iterations: 2 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$D$12	Total Contribution (Objective): Model 102	$ 11,200,000.00	$ 12,000,000.00

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	1900	1500	Contin
$D$6	Quantity Produced Model 102	1100	1500	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$15	Engine LHS Equation	4500	$E$15<=$F$15	Binding	0
$E$16	Stamping LHS Equation	6000	$E$16<=$F$16	Binding	0
$E$17	101 Assembly LHS Equation	3000	$E$17<=$F$17	Not Binding	2000
$E$18	102 Assembly LHS Equation	4500	$E$18<=$F$18	Binding	0

Merton Truck Problem 1

		Production Amounts		
		Model 101	Model 102	Model 103
	Quantity Produced	0	857	2857.142857
Sales price per Unit:		$ 39,000.00	$ 38,000.00	$ -
Costs:	Materials	$ 24,000.00	$ 20,000.00	$ -
	Labor	$ 4,000.00	$ 4,500.00	$ -
	Variable Overhead	$ 8,000.00	$ 8,500.00	$ -
Contribution/Unit:		$ 3,000.00	$ 5,000.00	$ 2,351.00
Total Contribution (Objective):				$11,002,857

					LHS Equation	RHS Limit
Constraints:	Engine	1	2	0.8	4000	4000
	Stamping	2	2	1.5	6000	6000
	101 Assembly	2	0	1	2857	5000
	102 Assembly	0	3	0	2571	4500

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_2
Report Created: 7/22/2018 10:30:08 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: GRG Nonlinear
Solution Time: 0.031 Seconds.
Iterations: 0 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Convergence 0.0001, Population Size 100, Random Seed 0, Derivatives Forward, Require Bounds
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$E$12	Total Contribution (Objective): Model 103	$ 11,000,000	$ 11,000,000

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	2000	2000	Contin
$D$6	Quantity Produced Model 102	1000	1000	Contin
$E$6	Quantity Produced Model 103	0	0	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$F$15	Engine LHS Equation	4000	$F$15<=$G$15	Not Binding	1.53843E-05
$F$16	Stamping LHS Equation	6000	$F$16<=$G$16	Binding	0
$F$17	101 Assembly LHS Equation	4000	$F$17<=$G$17	Not Binding	999.9999692
$F$18	102 Assembly LHS Equation	3000	$F$18<=$G$18	Not Binding	1500.000046

Microsoft Excel 16.0 Answer Report
Worksheet: [Book1]MT_2
Report Created: 7/22/2018 10:53:38 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: Simplex LP
Solution Time: 0.031 Seconds.
Iterations: 4 Subproblems: 0

Solver Options

Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$E$12	Total Contribution (Objective): Model 103	$ 11,002,857	$ 11,002,857

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$6	Quantity Produced Model 101	0	0	Contin
$D$6	Quantity Produced Model 102	857	857	Contin
$E$6	Quantity Produced Model 103	2857.142857	2857.142857	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$F$15	Engine LHS Equation	4000	$F$15<=$G$15	Binding	0
$F$16	Stamping LHS Equation	6000	$F$16<=$G$16	Binding	0
$F$17	101 Assembly LHS Equation	2857	$F$17<=$G$17	Not Binding	2142.857143
$F$18	102 Assembly LHS Equation	2571	$F$18<=$G$18	Not Binding	1928.571429

Microsoft Excel 16.0 Sensitivity Report
Worksheet: [Book1]MT_2
Report Created: 7/22/2018 10:30:09 PM

Variable Cells

Cell	Name	Final Value	Reduced Gradient
$C$6	Quantity Produced Model 101	2000.000015	0
$D$6	Quantity Produced Model 102	999.9999846	0
$E$6	Quantity Produced Model 103	0	-350.0008372

Constraints

Cell	Name	Final Value	Lagrange Multiplier
$F$15	Engine LHS Equation	3999.999985	1999.999823
$F$16	Stamping LHS Equation	6000	500.0001178
$F$17	101 Assembly LHS Equation	4000.000031	0
$F$18	102 Assembly LHS Equation	2999.999954	0