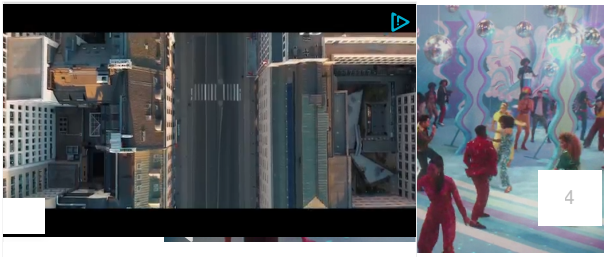


Learn More

MORE REASONS TO RECONNECT.
• Added protection with the Delta CareStandard℠
• New trip-planning tools
FLIGHTS TO CINCINNATI
FROM $238
KEEP CLIMBING DELTA
CONTINUE PLANNING >
*Terms and bag fees apply.

e and to show you relevant advertising. By browsing this website, you agree to our use of cookies. Learn more Accept

Support us
I want to sell my website www.AtoZmath.com with complete code
Select Language
Powered by Google Translate
arch problem
s new | College Algebra | Games | Feedback | About us
hods | Statistical Methods | Operation Research | Word Problems | Calculus | Geometry | Pre-Algebra

Algorithm and examples

Method 1. Simplex method (BigM method)

Solve the Linear programming problem using Simplex method calculator

Type your linear programming problem

```
MAX z = x1 + 3x2 + 2x3
subject to
x1 <= 10
x2 <= 10
3x1 + x2 + 5x3 <= 10
x1 + 3x2 <= 12
```

OR

Total Variables : 3 Total Constraints : 5 Generate

Max z = 1 x1 + 3 x2 + 2 x3

Subject to constraints

1	x1 +	0	x2 +	0	x3	<=	10
0	x1 +	1	x2 +	0	x3	<=	10
3	x1 +	1	x2 +	5	x3	<=	10
1	x1 +	3	x2 +	0	x3	<=	12
0	x1 +	0	x2 +	1	x3	>=	2

and x1,x2,x3 >= 0 and unrestricted in sign x1, x2, x3

Mode : Decimal

Calculate : Zj-Cj

Alternate Solution (if exists) Artificial Column Remove Subtraction Steps

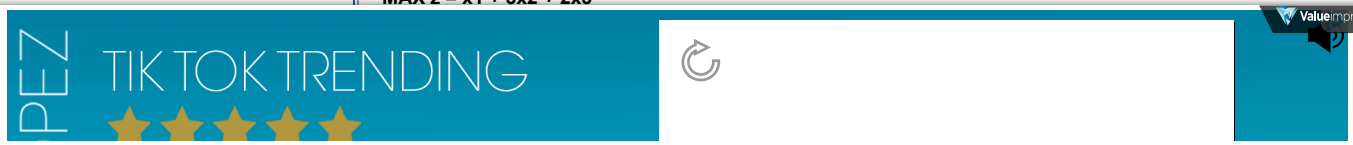
Find Random New

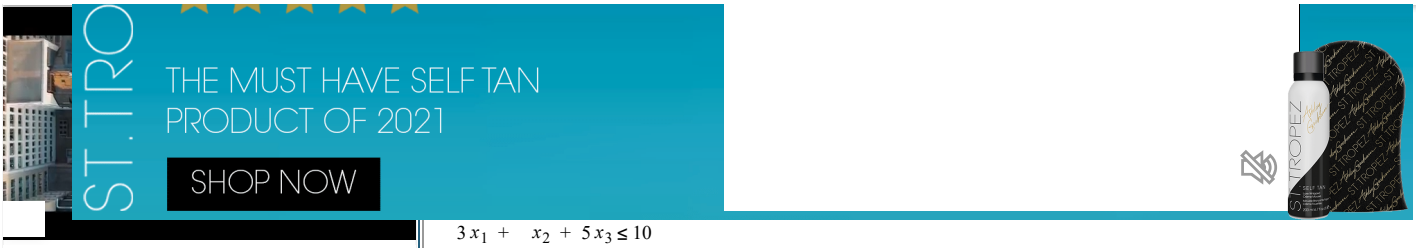
Solution Help

Solution will be displayed step by step (In 3 parts)

Solution

Find solution using Simplex method (BigM method)
MAX z = x1 + 3x2 + 2x3





Learn More

$$3x_1 + x_2 + 5x_3 \le 10$$
$$x_1 + 3x_2 \le 12$$
$$x_3 \ge 2$$

and $x_1, x_2, x_3 \ge 0$;

The problem is converted to canonical form by adding slack, surplus and artificial variables as appropiate

1. As the constraint-1 is of type ' $\le$ ' we should add slack variable S_1

2. As the constraint-2 is of type ' $\le$ ' we should add slack variable S_2

3. As the constraint-3 is of type ' $\le$ ' we should add slack variable S_3

4. As the constraint-4 is of type ' $\le$ ' we should add slack variable S_4

5. As the constraint-5 is of type ' $\ge$ ' we should subtract surplus variable S_5 and add artificial variable A_1

After introducing slack,surplus,artificial variables

Max $z = x_1 + 3x_2 + 2x_3 + 0S_1 + 0S_2 + 0S_3 + 0S_4 + 0S_5 - MA_1$

subject to

$$x_1 + S_1 = 10$$
$$x_2 + S_2 = 10$$
$$3x_1 + x_2 + 5x_3 + S_3 = 10$$
$$x_1 + 3x_2 + S_4 = 12$$
$$x_3 - S_5 + A_1 = 2$$

and $x_1, x_2, x_3, S_1, S_2, S_3, S_4, S_5, A_1 \ge 0$

Iteration-1		C_j	1	3	2	0	0	0	0	0	$-M$	
B	C_B	X_B	x_1	x_2	x_3	S_1	S_2	S_3	S_4	S_5	A_1	**MinRatio** $\frac{X_B}{x_3}$
S_1	0	10	1	0	0	1	0	0	0	0	0	---
S_2	0	10	0	1	0	0	1	0	0	0	0	---
S_3	0	10	3	1	5	0	0	1	0	0	0	$\frac{10}{5} = 2$
S_4	0	12	1	3	0	0	0	0	1	0	0	---
A_1	$-M$	2	0	0	(1)	0	0	0	0	-1	1	$\frac{2}{1} = 2 \rightarrow$
$z = -2M$		Z_j	**0**	**0**	$-M$	**0**	**0**	**0**	**0**	M	$-M$	
		$Z_j - C_j$	-1	-3	$-M - 2 \uparrow$	0	0	0	0	M	0	

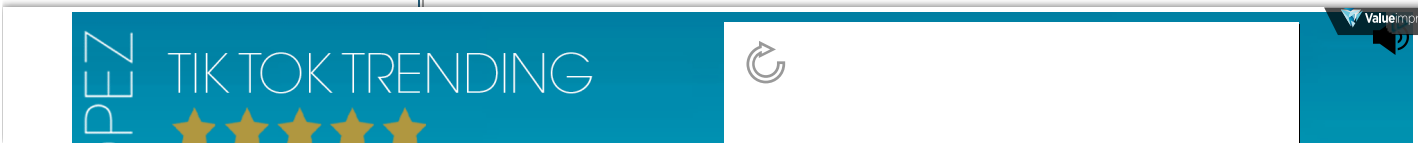
Negative minimum $Z_j - C_j$ is $-M - 2$ and its column index is 3. So, the entering variable is x_3.

Minimum ratio is 2 and its row index is 5. So, the leaving basis variable is A_1.

$\therefore$ The pivot element is 1.

Entering $= x_3$, Departing $= A_1$, Key Element $= 1$

$+ R_5$(new) $= R_5$(old)



Learn More

Iteration-2		C_j	1	3	2	0	0	0	0	0	
B	C_B	X_B	x_1	x_2	x_3	S_1	S_2	S_3	S_4	S_5	MinRatio $\frac{X_B}{x_2}$
S_1	0	10	1	0	0	1	0	0	0	0	---
S_2	0	10	0	1	0	0	1	0	0	0	$\frac{10}{1} = 10$
S_3	0	0	3	(1)	0	0	0	1	0	5	$\frac{0}{1} = 0 \rightarrow$
S_4	0	12	1	3	0	0	0	0	1	0	$\frac{12}{3} = 4$
x_3	2	2	0	0	1	0	0	0	0	-1	---
$z = 4$		Z_j	0	0	2	0	0	0	0	-2	
		$Z_j - C_j$	-1	-3 ↑	0	0	0	0	0	-2	

Negative minimum $Z_j - C_j$ is -3 and its column index is 2. So, the entering variable is x_2.

Minimum ratio is 0 and its row index is 3. So, the leaving basis variable is S_3.

∴ The pivot element is 1.

Entering $= x_2$, Departing $= S_3$, Key Element $= 1$

✚ R_3(new) = R_3(old)

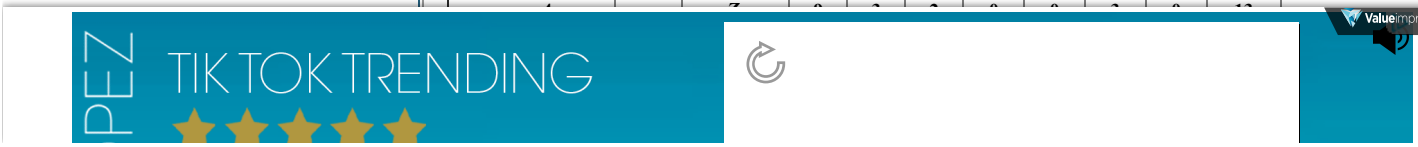
✚ R_1(new) = R_1(old)

✚ R_2(new) = R_2(old) - R_3(new)

✚ R_4(new) = R_4(old) - $3R_3$(new)

✚ R_5(new) = R_5(old)

Iteration-3		C_j	1	3	2	0	0	0	0	0	
B	C_B	X_B	x_1	x_2	x_3	S_1	S_2	S_3	S_4	S_5	MinRatio
S_1	0	10	1	0	0	1	0	0	0	0	
S_2	0	10	-3	0	0	0	1	-1	0	-5	
x_2	3	0	3	1	0	0	0	1	0	5	
S_4	0	12	-8	0	0	0	0	-3	1	-15	
x_3	2	2	0	0	1	0	0	0	0	-1	



Learn More

Solution provided by AtoZmath.com

Any wrong solution, solution improvement, feedback then **Submit Here**

CLICK TO GET A

NOW!

Copyright © 2021. All rights reserved. **Terms**, **Privacy**