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[Home](#) > [Operation Research calculators](#) > Primal to dual conversion calculator

## Algorithm and examples

Method 6. Primal to Dual ▼

**Solve the Linear programming problem using  
Primal to dual conversion calculator**

Type your linear programming problem

```
MAX Z = 5x1 + 6x2
subject to
x1 + 9x2 <= 60
2x1 + 3x2 <= 45
5x1 - 2x2 <= 20
x2 <= 30
```

OR

Total Variables : 2 Total Constraints : 5 Generate

Max ▼ Z = 5 x1 + 6 x2

Subject to constraints

1 x1 + 9 x2 <= 60

2 x1 + 3 x2 <= 45

5 x1 + -2 x2 <= 20

0 x1 + 1 x2 <= 30

4 x1 + 7 x2 >= 2

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

Mode : Decimal ▼

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Solution Help

**Solution will be displayed step by step (In 2 parts)**

### Solution

**Find dual from primal conversion**

**MAX Z = 5x1 + 6x2**

**subject to**

**x1 + 9x2 <= 60**

**2x1 + 3x2 <= 45**

**5x1 - 2x2 <= 20**

**x2 <= 30**

**4x1 + 7x2 >= 2**

**and x1,x2 >= 0**

**Solution:**

**Primal is** (Solution steps of Primal by [BigM method](#))

**MAX  $Z_x = 5x_1 + 6x_2$**

**subject to**

$x_1 + 9x_2 \leq 60$

$2x_1 + 3x_2 \leq 45$

$5x_1 - 2x_2 \leq 20$

$x_2 \leq 30$

$4x_1 + 7x_2 \geq 2$

and  $x_1, x_2 \geq 0$ ;

all  $\geq$  constraints can be converted to  $\leq$  type by multiplying both sides by -1

**MAX  $Z_x = 5x_1 + 6x_2$**

**subject to**

$x_1 + 9x_2 \leq 60$

$2x_1 + 3x_2 \leq 45$

$$5x_1 - 2x_2 \leq 20$$

$$x_2 \leq 30$$

$$-4x_1 - 7x_2 \leq -2$$

$$\text{and } x_1, x_2 \geq 0;$$

**Dual is** (Solution steps of Dual by **BigM method**)

$$\text{MIN } Z_y = 60y_1 + 45y_2 + 20y_3 + 30y_4 - 2y_5$$

subject to






$$y_1 + 2y_2 + 5y_3 - 4y_5 \geq 5$$

$$9y_1 + 3y_2 - 2y_3 + y_4 - 7y_5 \geq 6$$

$$\text{and } y_1, y_2, y_3, y_4, y_5 \geq 0;$$

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