



## Quiz 3

1/1 question correct

Excellent!

Retake

Next (/learn/approximation-algorithms-part-2/supplement/sdmjG/slides)



1.

Consider the following LP.

PRIMAL:

$$\max 10y_1 + 2y_2 + 4y_3 + 8y_4$$

s.t.

$$(\text{Constraint 1}) \ y_1 + y_2 - 5y_3 + 6y_4 \leq 10$$

$$(\text{Constraint 2}) \ y_1 + y_3 - y_4 \leq 5$$

$$(\text{Constraint 3}) \ y_1 - y_2 - 2y_3 + y_4 \leq 4$$

$$(\text{Constraint 4,5,6,7}) \ y_1, y_2, y_3, y_4 \geq 0$$

The dual of this LP is as follows:

DUAL:

$$\min 10x_1 + 5x_2 + 4x_3$$

s.t.

$$(\text{Constraint 1}) \ x_1 + x_2 + x_3 \geq 10$$

$$(\text{Constraint 2}) \ x_1 - 1x_3 \geq 2$$

$$(\text{Constraint 3}) \ -5x_1 + x_2 - 2x_3 \geq 4$$

(Constraint 4)  $6x_1 - 1x_2 + x_3 \geq 8$

(Constraint 5,6,7)  $x_1, x_2, x_3 \geq 0$

There exists a convex combination of the constraints 1,2,3,4 of the dual that gives the value of the optimal solution for the primal.

What are the coefficients of the constraints in the convex combination?

☐ constraint 1 : 10  
constraint 2 : 5  
constraint 3 : 5  
constraint 4 : 3

☐ constraint 1 : 12  
constraint 2 : 64  
constraint 3 : 0  
constraint 4 : 0

☐ constraint 1 : 12  
constraint 2 : 0  
constraint 3 : 10  
constraint 4 : 8

☐ constraint 1 : 0  
constraint 2 : 0  
constraint 3 : 40  
constraint 4 : 35

**Well done!**

