Corner Point Property

Very important property of Linear Programming problems:

***Corner Point Property*.**

Property states optimal solution to LP problem will ***always*** *occur at a corner point*.

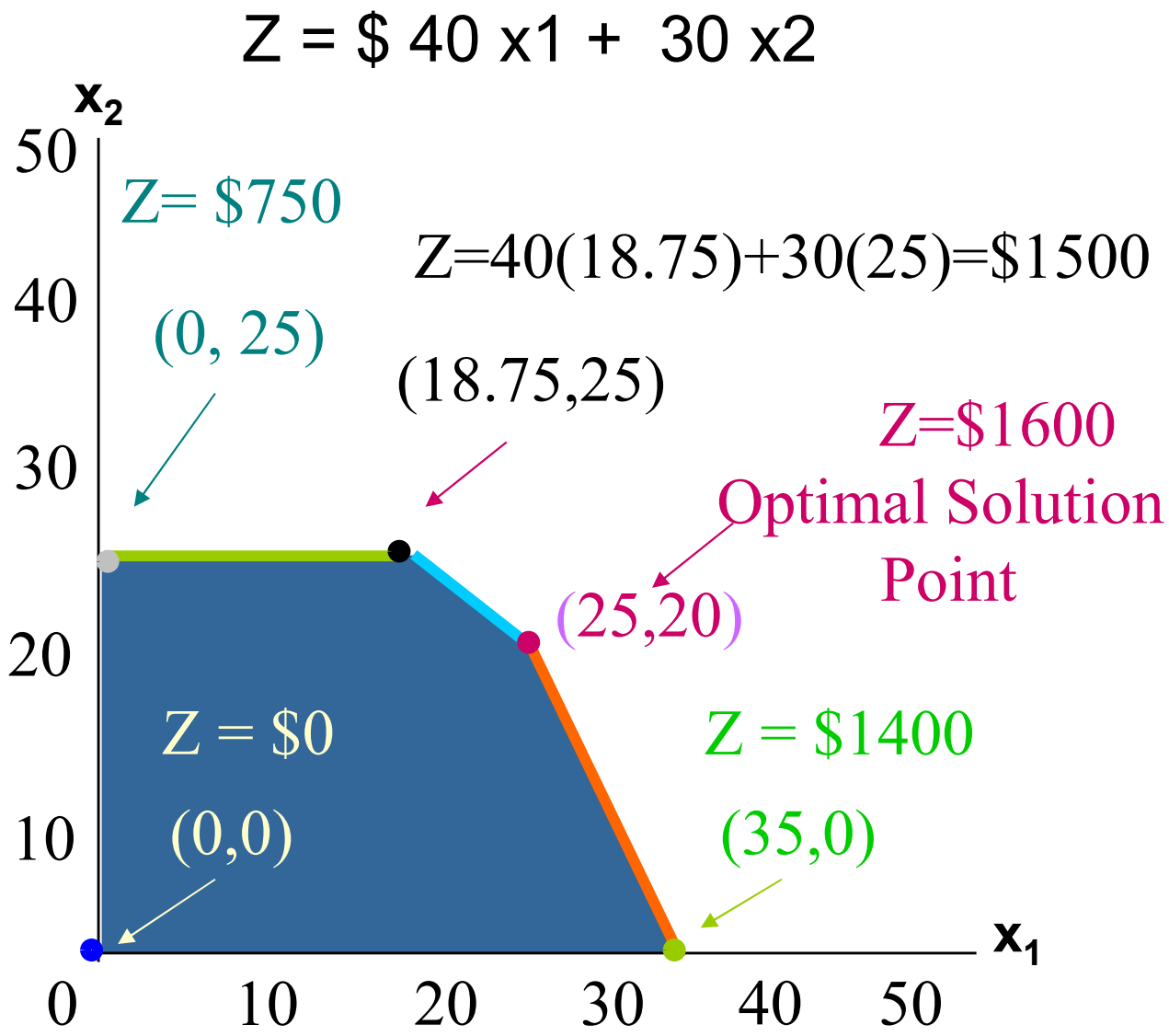
- The solution point will be on the boundary of the feasible solution area and at one of the corners of the boundary where two constraint lines intersect

3. The Optimal Solution: A. The Corner Points Method

- Solve simultaneous equations at each corner point to find the solution values at each point.
- Substitute these values into the objective function (Z) to find the set of values that results in the maximum Z value.

For assistance with the above, watch the videos posted on Brighspace.

A. The Optimal Solution



Interpretation of the Solution

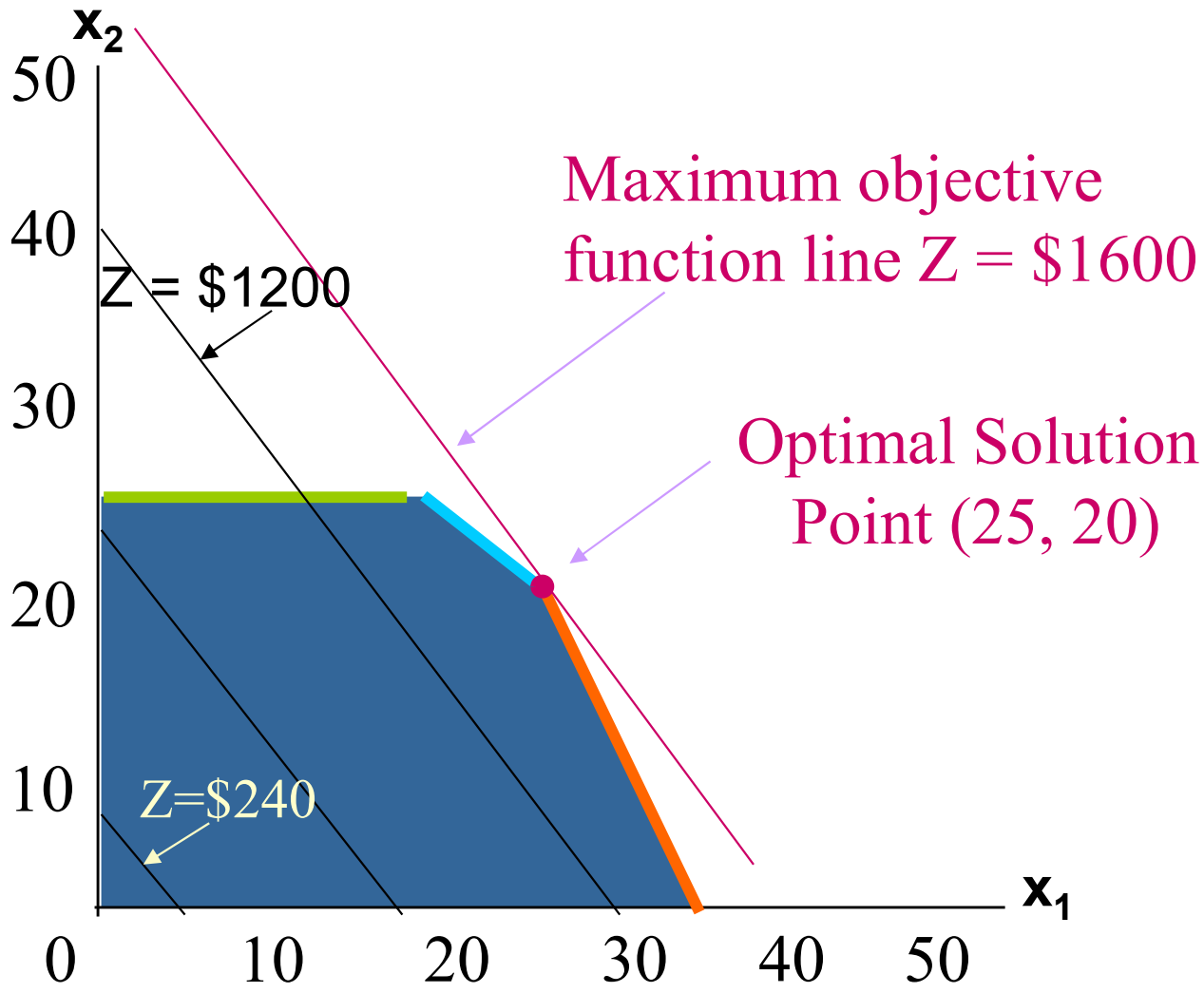
- The solution indicates that if RMC, Inc. produces 25 tons of fuel additive and 20 tons of solvent base, it will receive $1600, the maximum profit possible given the Material constraints (resources constraints)
- The solution tells management that the optimal solution will require all available material 1 and material 3, but only 4 of 5 tons of material 2.
- The 1 ton of material 2 is referred as **slack**.

3. The Optimal Solution:
B. The Objective Function Line Method

1. Select value for profit or cost, and draw objective function line to reveal its slope
   - Z = $240 (an arbitrary value. You can also choose Z=$1200)
2. With a maximization problem, maintain same slope and move line up and right until it touches feasible region at one point. With minimization, move down and left until it touches only one point in feasible region.
3. Identify **optimal solution** as coordinates of point touched by highest possible objective function line (maximization) or lowest possible objective function line (minimization).
4. Read optimal coordinates and compute optimal profit or cost.

B. The Optimal Solution

$$Z = \$\ 40\ x1 + \ 30\ x2$$



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