FST Midterm Topics

I. Logic

Induction: reasoning that constructs or evaluates general propositions that are derived from specific examples.

Deduction: the process of reasoning from one or more general statements to reach a logically certain conclusion.

Counter Example: example of something that disproves a claim. Statement : All numbers are less than one million. Counterexample: 2 million

II. Sets
   a. Symbols
   b. Venn Diagrams

III. Counting and Probability
   a. FCP, Permutations, Combinations
   b. Probability Rules

IV. Linear Programming
   a. Define Variables
   b. Writing Constraint Inequalities
   c. Writing Objective Equation
   d. Graph and Find Corner Points
   e. Solve
   f. Analyze Situation

Paisan's Pizza makes gourmet frozen pizzas for sale to supermarket chains. They make only deluxe pizzas, one vegetarian and the other with meat. Their business planning has these constraints and objective: Each vegetarian pizza takes 12 minutes of labor and each meat pizza takes 6 minutes of labor. The plant has at most 3,600 minutes of labor available each day. The plant freezer can handle a total of at most 500 pizzas per day. Vegetarian pizza is not quite as popular as meat pizza, so the plant makes at most 200 of this type each day. The sale of each vegetarian pizza earns Paisan's $3 profit and each meat pizza earns $2 profit. Find the number of each type of pizza that will maximize profit.

Let
x = veggie
y = meat

Constraints:

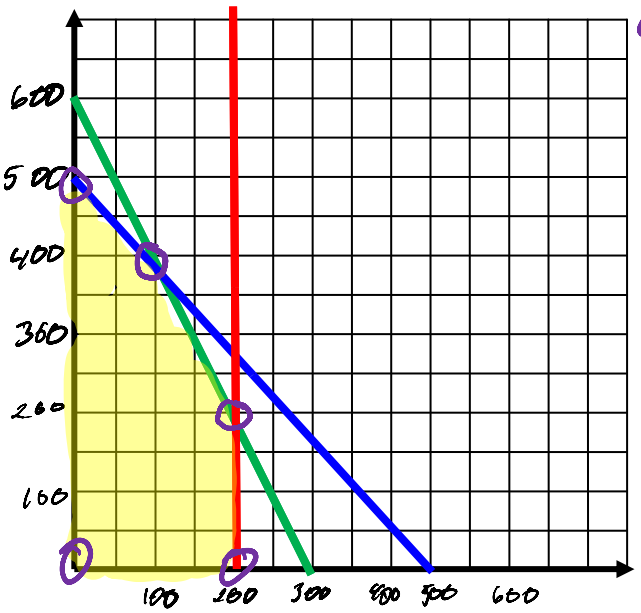
$12x + 6y \leq 3600$

$x + y \leq 500$

$x \leq 200$

Objective:

$P = 3x + 2y$



Corner points:

	P
(0, 500)	1000
(200, 0)	600
(200, 200)	1000
(100, 400)	1100
(0, 0)	0

V. Polynomial Operations
   a. Addition/Subtraction (Combining Like Terms)
   b. Multiplication
      i. Distribution
      ii. Binomial Expansion or Pascal's Triangle
      iii. Compositions
   c. Division
      i. Long
      ii. Synthetic
   d. Factoring
      i. All Types
      ii. U-Substitution ($x^{\frac{2}{3}} + x^{\frac{1}{3}} - 12 = 0$)

VI. Limits
   a. Graphically
   b. Algebraically
   c. Table-ly
   d. Piecewise

Let $u = x^{\frac{1}{3}}$

$u^2 + u - 12 = 0$

$(u+4)(u-3) = 0$

$u = -4 \quad u = 3$

$x^{\frac{1}{3}} = -4 \quad x^{\frac{1}{3}} = 3$

$x = (-4)^3 = -64 \quad x = 3^3 = 27$

$x = -64$ and $x = 27$