

MAT215 Math for Business Analysis

Description: A study of mathematics focused on solving business-related problems by applying the concepts of linear programming, optimization, statistics, probability and multivariable calculus.

Prerequisites: MAT211 or MAT212

Learning Outcomes	Sample Problems
<p>1. (Application Level) Solve problems with functions of several variables.</p>	<p>Cost Function: A small manufacturing company produces two models of a surfboards: a standard model and a competition model. If the standard model is produced at a variable cost of \$70 each, the competition model at a variable cost of \$100 each, and the total fixed costs per month are \$2,000, the monthly cost function is given by $C(x, y) = 2000 + 70x + 100y$ Where x and y are the number of standard and competition boards produced per month, respectively. Find: a) $C(20,10)$ b) $C(50,5)$ c) $C(30,30)$</p>
<p>2. (Application Level) Solve business-related multivariable optimization problems, including linear programming problems, using technology when appropriate.</p>	<p>A craftswoman makes two products, floor lamps and table lamps. Production of one floor lamp requires 75 minutes of labor and materials that cost \$25. Production of one table lamp requires 50 minutes and materials that cost \$20. The craftswoman wishes to work no more than 40 hours each week, and her financial resources allow her to pay no more that \$900 for materials each week. If she can sell as many lamps as she can make and if her profit is \$39 per floor lamp and \$33 per table lamp, how many floor lamps and table lamps should she make each week in order to maximize her weekly profit? (Let x = the number of floor lamps and let y = the number of talbe lamps.)</p>
<p>3. (Application Level) Solve application problems using matrices and determinants focusing on business and/or economics problems.</p>	<p>Pretzels cost \$4/lb, dried fruits, \$5/lb. and nuts \$9/lb. The three ingredients are to be combined in a trail mix containing twice the weight of pretzels as dried fruit. How many pounds of each should be used to produce 140 lbs. at \$6/lb?</p>
<p>4. (Application Level) Utilize the principles of set theory, Venn diagrams, counting techniques and combinatorics to solve problems.</p>	<p>Credit Cards: A survey of consumer finance found that 25.4% of credit-card-holding families hardly ever pay off the balance. Suppose a random sample of 20 credit-card-holding families is taken. <i>Source: Statistical Abstract of the United States.</i> Find the probabilities of each of the following results. a) exactly 6 families hardly ever pay off the balance b) at least 5 families hardly ever pay off the balance</p>
<p>5. (Synthesis Level) Derive solutions using probability concepts.</p>	<p>A certain life insurance company insures persons of age 20 accordingly. 50 policies for \$75,000 100 policies for \$20,000 250 policies for \$7500 The probability of death at age 20 is 0.0012. Find the expected payout.</p>
<p>6. (Application Level) Solve statistics problems utilizing discrete and continuous distributions.</p>	<p>The SAT has a mean of 500 and a standard deviation of 100. The ACT has a mean of 18 and a standard deviation of 6. Both tests measure the same kind of ability, with scores that are normally distributed. Suppose that you score 550 on the SAT and 24 on the ACT. On which test did you have the better score?</p>

<p>7.(Application Level) Utilize graphing calculators and available computer software to model, investigate, solve and justify solutions to given problems.</p>	<p>The placement test for a college has scores that are normally distributed with a mean of 500 and a standard deviation of 100. If the college accepts only the top 10% of examinees, what is the cutoff score on the test for admission?</p>
<p>8. (Application Level) Utilize the principles of the math of finance with simple/compound interest as well as future/present value of an annuity and amortizations.</p>	<p>Hong Le buys a car costing \$14,000. He agrees to make payments at the end of each monthly period for 4 years. He pays 7% interest, compounded monthly. What is the amount of each payment? Find the total amount of interest Le will pay.</p>