

# MATH 130

## Study Guide for Exam 4, Chapters 16, 3 and 13

This is a list of topics that could be used to generate questions for Exam 4. Pages and questions from the text are included, but be sure to also study the types of problems from the online material.

- Chapter 16: Probability, Odds, and Expectations

1. Know the following vocabulary terms: (page 507)

- random experiment
- impossible event
- complementary events
- sample space
- certain event
- independent events
- event
- simple event

2. Sample Space and Outcomes

- Write out the sample space for an experiment. (pages 480 to 484, questions 1-16 on pages 508 and 509)
- Calculate the size of the sample space.
- Calculate the number of possible combinations using the multiplication rule. (pages 485 to 488, questions 17-26 on pages 509 and 510)

3. Probability

- Compute the probability assignment for a probability space. (pages 491 to 493, questions 33-44, 45 (a-e), 46 on pages 510 to 512)
- Compute the probability of an event in an equiprobable space. (page 492)
- Compute probabilities of complementary events and independent events. (pages 493 and 494, questions 49 and 50 on page 512)
- Know about coins, dice, and a deck of cards. These objects will be used for probability questions.

4. Probability and odds

- Convert from probability to odds. (page 496, questions 51 and 52 on page 512)
- Convert from odds to probability. (page 496, questions 53 and 54 on page 512)

5. Expectations and Risk

- Calculate a weighted average. (pages 497 and 498, questions 57-60 on pages 512 and 513)
- Calculate expected values. (pages 500-506, questions 65-72 on page 513)
- Determine if a game is fair. (page 503)

- Chapter 3: Fair Division

1. Know the following vocabulary terms: (pages 89 and 90)

- assets
- fair-division
- fair shares
- players
- fair-division method

2. Method of Sealed Bids

(a) Sealed Bids (pages 81 and 82, questions 43-48 on pages 98 and 99)

- Identify the winner of each item.
- Calculate fair shares for each player.
- Calculate how much money a player owes or is owed by the estate.
- Calculate the surplus.
- Determine the final allocation and describe what each person receives and/or pays.

(b) Apply sealed bids in a reverse auction setting. (pages 83 and 84, questions 49-50 on pages 99 and 100)

3. Method of Markers (page 85, questions 51-56 on page 100)

- (a) Identify fair shares for each player.
- (b) Determine if a collection of items would not be fair for a player.
- (c) Use the Method of Markers to determine a fair allocation for reach player.
- (d) Identify left-over items.

- Chapter 13: Fibonacci Numbers

1. Interpret subscript notation such as  $F_N$ ,  $F_{N-1}$ , and  $F_{N+2}$ .
2. Fibonacci numbers (pages 390 and 391)
  - Recognize the Fibonacci numbers.
  - Calculate the next Fibonacci number in a sequence.
  - Perform basic calculations writing Fibonacci numbers with subscript notation. (questions 1-4 on page 405)
  - Calculate a new Fibonacci number given two other Fibonacci numbers and how they are related. (questions 7-10 on page 405)
3. Golden Ratio (pages 393-396)
  - Know the Golden Ratio as a decimal and as an exact expression.
  - Approximate the Golden Ratio using consecutive Fibonacci numbers.
  - Recognize objects that have golden proportions.
    - \* Golden Rectangles (page 395)
    - \* Golden Triangles (page 398)
4. Construct a Fibonacci spiral. (page 401)
5. Recognize Fibonacci numbers and spiral in nature/art. (Page 393, 402, and 403)