

Student's Name and Section:_____

This exam covers Chapter 4.5,4.6,4.7, 5.3,5.4, Chapter 6 and Chapter on Financial Mathematics

1. An urn contains 6 white balls and 10 red balls. A sample of six balls is selected at random from the urn. [8]
 - a) What is the probability that the sample has 3 white and 3 red balls?
 - b) What is the probability that the sample has at least 2 red balls?
2. Four cards are drawn from an unbiased deck of 52 cards. What is the probability that there are two red and two black cards. [4]
 - b) Two red cards are put back in the deck, and then two more cards are then drawn. What is the probability both are aces?
3. Find the probability of obtaining exactly three heads when tossing a fair coin six times. (Use the concept from Binomial Trials. **No points will be given for using any other method even if the answer is correct . Show all the relevant work to get partial credit**) [6]

Questions on the Home work should be known and solved for complete understanding of the material. These problems are only for practice and should not be considered as exam questions. These are given to help you prepare for the exam.

4.5 : 4, 6, 13, 26, 28,

4.6 : 10, 12, 18, 24, 26, 28, 34, , 42, 48

4.7 : 4, 8, 12, 18, 24, 2630

5.3 : 2, 10, 12, 14, 16, 26, 32, 38

5.4 : 8, 16, 18, 20, 2436, 38

4. Random Variable and Histograms

Example 4, 5 page 294, Example 7 page 296

6.1 : 2, 6, 10, 12, 18, 20

5. Measure of Central Tendency

Example 1 page 303, Example 4 page 306, Example 6, 7 page 307

6.2 : 16, 18, 26, 30, 32

6. Measures of Spread

Example 1 page 318

6.3 : 23, 24, 31, 32

7. The Normal Distribution

Example 1 Page 332

6.4 : 4, 6, 8

8. A teacher wishes to "curve" a test whose grades were normally distributed with a mean of 65 and standard deviation of 12. The top 10% of the class will get an A, the next 30% of the class will get a B, the next 30% of the class will get a C, the next 20% of the class will get a D and the bottom 10% of the class will get an F. Find the cutoff for each of these grades Round your answers to 2 decimal places.

9. Simple Interest

F12, 4, 6, 10, 12, 16, 26

10. Compound Interest

F2 2, 4, 10, 12, 16, 30, 32

11. Annuities and Sinking funds

F3 6, 16, 18, 26

12. Present Value of Annuities and Amortization

F4 4, 14, 16, 38, 40

13. **This is question 10 in the solutions** Determine i and n for the following situations:

- a.) 6 % compounded annually for 3 years
- b.) 6 % compounded monthly from Jan. 1, 2001 to July 1, 2005
- c.) 9 % interest compounded quarterly from Jan 1, 2001 to Oct. 1, 2004

14. **This is question 11 in the solutions** Tim deposits \$800 into a savings account at the end of every quarter-year for 5 years at 6 % interest compounded quarterly.

- a.) Find the balance at the end of five years
- b.) How much interest will be earned during the 5 years?

15. **This is question 12 in the solutions** Is it more profitable for Megan to receive \$1,000 now or \$1,700 in 9 years? Assume that she can earn interest at 6 % compounded annually on the money she receives now.

16. **This is question 13 in the solutions** James buys a house for \$90000. He puts \$10000 down and then finances the rest at 9% interest compounded monthly for 25 years.

- a) Find the monthly payment.
- b) Find the total amount he pays for the house.
- c) Find the total amount of interest he pays.
- d) Find the amount he still owes after 23 years.
- e) Find the amount he still owes after 24 years.
- f) Find the total amount of interest he pays in the year 24.

17. How many years are required for \$1000 to grow to \$1210 at 7% simple interest?

Some Useful Formulas

- Simple Interest

$$F = (1 + nr)P$$

- Compound Interest

$$1. F = (1 + i)^n P = \left(1 + \frac{r}{m}\right)^{mt} P$$

$$2. P = \frac{1}{(1 + i)^n} \cdot F$$

$$3. r_{\text{eff}} = (1 + i)^m - 1$$

$$4. n = \frac{\log F/P}{\log(1 + i)}$$

- Annuity Future Value

$$F = R \times \frac{(1 + i)^n - 1}{i}$$

- Annuity Present Value

$$P = R \times \frac{(1 + i)^n - 1}{i(1 + i)^n}$$

- Amortized Loan

$$R = \frac{P}{\frac{(1 + i)^n - 1}{i(1 + i)^n}}$$