

# MATH 1332 - CONTEMPORARY MATH

## FINAL REVIEW 1

L F Thomas - Instructor

The principal  $P$  is borrowed at simple interest rate  $r$  for a period of time  $t$ . Find the simple interest owed for the use of the money. Assume 360 days in a year and round answer to the nearest cent.

- 1)  $P = \$140$   
 $r = 4\%$   
 $t = 3$  years

The principal  $P$  is borrowed at simple interest rate  $r$  for a period of time  $t$ . Find the loan's future value,  $A$ , or the total amount due at time  $t$ . Round answer to the nearest cent.

- 2)  $P = \$3000$ ,  $r = 7\%$ ,  $t = 1$  year

The principal  $P$  is borrowed and the loan's future value,  $A$ , at time  $t$  is given. Determine the loan's simple interest rate,  $r$ , to the nearest tenth of a percent.

- 3)  $P = \$3000$ ,  $A = \$3270$ ,  $t = 1$  year

Determine the present value,  $P$ , you must invest to have the future value,  $A$ , at simple interest rate  $r$  after time  $t$ . Round answer to the nearest dollar.

- 4)  $A = \$5500$ ,  $r = 10\%$ ,  $t = 1$  year

Solve the problem.

- 5) Lonnie needs extra money to buy a truck to start up a delivery service. He takes out a simple interest loan for \$6000.00 for 7 months at a rate of 7.25%. How much interest must he pay, and what is the future value of the loan?

The principal represents an amount of money deposited in a savings account subject to compound interest at the given rate. Find how much money will be in the account after the given number of years (Assume 360 days in a year.), and how much interest was earned.

$$A = P \left( 1 + \frac{r}{n} \right)^{nt} \quad P = \frac{A}{\left( 1 + \frac{r}{n} \right)^{nt}} \quad A = Pe^{rt} \quad Y = \left( 1 + \frac{r}{n} \right)^n - 1$$

- 6) Principal: \$8000  
Rate: 4%  
Compounded: semiannually  
Time: 5 years

Solve the problem.

- 7) A mother invests \$9000 in a bank account at the time of her daughter's birth. The interest is compounded quarterly at a rate of 7%. What will be the value of the daughter's account on her twentieth birthday, assuming no other deposits or withdrawals are made during this period?

Solve the problem.

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \quad P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}} \quad A = Pe^{rt} \quad Y = \left(1 + \frac{r}{n}\right)^n - 1$$

- 8) How much money should be deposited today in an account that earns 6% compounded semiannually so that it will accumulate to \$9000 in 2 years?

Solve the problem. Round to the nearest tenth of a percent.

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \quad P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}} \quad A = Pe^{rt} \quad Y = \left(1 + \frac{r}{n}\right)^n - 1$$

- 9) A passbook savings account has a rate of 6%. Find the effective annual yield if the interest is compounded monthly.

Determine the effective annual yield for each investment. Then select the better investment. Assume 360 days in a year. Round to the nearest hundredth of a percent when necessary.

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \quad P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}} \quad A = Pe^{rt} \quad Y = \left(1 + \frac{r}{n}\right)^n - 1$$

- 10) 7% compounded monthly; 7.25% compounded annually

Find the value of the annuity and the interest. Round to the nearest dollar.

$$A = \frac{P[(1+r)^t - 1]}{r} \quad A = \frac{P\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}{\left(\frac{r}{n}\right)} \quad P = \frac{A\left(\frac{r}{n}\right)}{\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}$$

- 11) Periodic Deposit: \$1000 at the end of each year  
Rate: 6.5% compounded annually  
Time: 13 years

Determine the periodic deposit. Round up to the nearest dollar. How much of the financial goal comes from deposits and how much comes from interest?

$$A = \frac{P[(1+r)^t - 1]}{r} \quad A = \frac{P\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}{\left(\frac{r}{n}\right)} \quad P = \frac{A\left(\frac{r}{n}\right)}{\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}$$

- 12) Periodic Deposit: \$? at the end of each year  
Rate: 8% compounded annually  
Time: 12 years  
Financial Goal: \$82,000

Solve the problem. Round up to the nearest dollar.

- 13) You would like to have \$52,000 in 5 years for the down payment on a new house following college graduation by making deposits at the end of every three months in an annuity that pays 4.25% compounded quarterly. How much should you deposit at the end of every three months? How much of the \$52,000 comes from deposits and how much comes from interest?

Use  $PMT = \frac{P\left(\frac{r}{n}\right)}{\left[1 - \left(1 + \frac{r}{n}\right)^{-nt}\right]}$  to determine the regular payment amount, rounded to the nearest dollar.

- 14) The price of a home is \$250,000. The bank requires a 15% down payment and two points at the time of closing. The cost of the home is financed with a 20-year fixed-rate mortgage at 6.5%.
- Find the required down payment.
  - Find the amount of the mortgage.
  - How much must be paid for the two points at closing?
  - Find the total cost of interest over 20 years, to the nearest dollar.

Solve the problem by applying the Fundamental Counting Principle with two groups of items.

- 15) In how many ways can a girl choose a two-piece outfit from 5 blouses and 7 skirts?
- 16) How many different four-letter secret codes can be formed if the first letter must be an S or a T?

Use the Fundamental Counting Principle to solve the problem.

- 17) There are 9 performers who are to present their acts at a variety show. How many different ways are there to schedule their appearances?

Evaluate the factorial expression.

18)  $\frac{8!}{(8 - 5)!}$

Use the formula for  ${}_nP_r$  to evaluate the expression.

19)  $9P_3$

Use the formula for  ${}_nP_r$  to solve.

- 20) A club elects a president, vice-president, and secretary-treasurer. How many sets of officers are possible if there are 9 members and any member can be elected to each position? No person can hold more than one office.

In the following exercises, does the problem involve permutations or combinations? Explain your answer. It is not necessary to solve the problem.

- 21) One hundred people purchase lottery tickets. Three winning tickets will be selected at random. If first prize is \$100, second prize is \$50, and third prize is \$25, in how many different ways can the prizes be awarded?

Use the formula for  ${}_nC_r$  to evaluate the expression.

22)  $10C_4$

Solve the problem.

- 23) From 9 names on a ballot, a committee of 3 will be elected to attend a political national convention. How many different committees are possible?

Use the empirical probability formula to solve the exercise. Express the answer as a fraction. Then express the probability as a decimal, rounded to the nearest thousandth, if necessary.

- 24) In 1999 the stock market took big swings up and down. A survey of 979 adult investors asked how often they tracked their portfolio. The table shows the investor responses. What is the probability that an adult investor tracks his or her portfolio daily?

How frequently?	Response
Daily	227
Weekly	281
Monthly	282
Couple times a year	135
Don't track	54

You are dealt one card from a 52-card deck. Find the probability that you are not dealt:

- 25) a diamond.

Solve the problem.

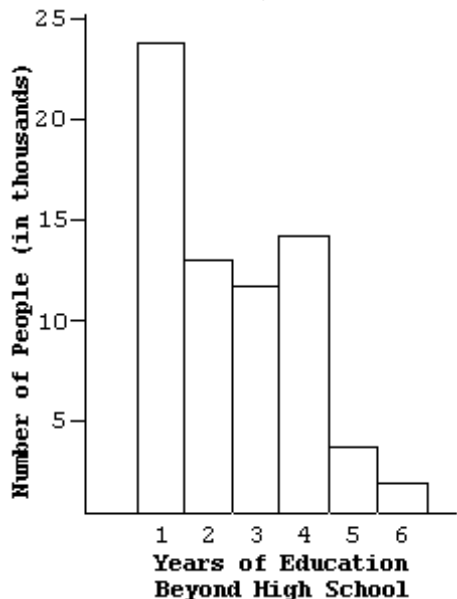
- 26) The government of a town needs to determine if the city's residents will support the construction of a new town hall. The government decides to conduct a survey of a sample of the city's residents. Which one of the following procedures would be most appropriate for obtaining a sample of the town's residents?
- A) Survey the first 400 people listed in the town's telephone directory.
  - B) Survey a random sample of employees at the old city hall.
  - C) Survey a random sample of persons within each geographic region of the city.
  - D) Survey every 12th person who walks into city hall on a given day.

- 27) The stem-and-leaf plot below displays the ages of 30 attorneys at a small law firm.

Stems	Attorneys
2	99
3	00112589
4	1234458
5	1233458
6	0137
7	12

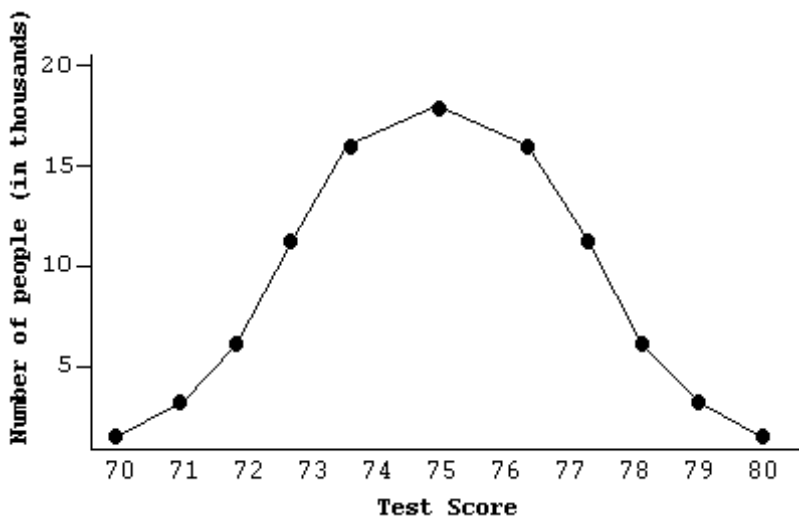
What is the age of the oldest attorney? What is the age of the youngest attorney?

28) Which one of the following is true according to the graph?



- A) The graph is based on a sample of approximately 62 thousand people.
- B) If the sample is truly representative, then for a group of 50 people, we can expect about 32 of them to have one year of education beyond high school.
- C) The percent of people with years of higher education greater than those shown by any rectangular bar is equal to the percent of people with years of education less than those shown by that bar.
- D) More people had 4 years of education beyond high school than 3 years.

29) The frequency polygon below shows a distribution of test scores.



Which one of the following is true based on the graph?

- A) The graph is based on a sample of approximately 15 thousand people.
- B) More people had a score of 75 than any other, and as the deviation from 75 increases or decreases, the scores fall off in a symmetrical manner.
- C) More people had a score of 77 than a score of 73.
- D) The percent of scores above any given score is equal to the percent of scores below that score.

Find the mean for the group of data items. Round to the nearest hundredth, if necessary.

30) 24, 24, 84, 89, 38, 24

Find the mean for the data items in the given frequency distribution. Round to the nearest hundredth, if necessary.

31)

Score	Frequency
x	f
1	4
2	2
3	5
4	7
5	10
6	6
7	9
8	11
9	12
10	12

Find the median for the group of data items.

32) 95, 95, 90, 42, 71, 95

Find the mode for the group of data items. If there is no mode, so state.

33) 1.4, 2.2, 1.6, 2.7, 1.4, 2.2, 1.4, 8.2, 8.2, 1.9

34) 1.3, 2.4, 1.6, 2.9, 1.3, 2.4, 1.3, 9.1, 9.1, 1.9

Find the midrange for the group of data items.

35) 100, 100, 94, 42, 75, 100

For the given data set, find the a. mean b. median c. mode (or state that there is no mode) d. midrange.

36) A company advertised that, on the average, 96% of their customers reported "very high satisfaction" with their services. The actual percentages reported in 15 samples were the following:

96, 96, 92, 35, 74, 96, 92, 74, 96, 96, 35, 92, 92, 96, 35

a. Find the mean, median, mode and midrange. b. Which measure of central tendency was given in the advertisement? c. Which measure of central tendency is the best indicator of the "average" in this situation?

## Answer Key

### Testname: REVIEW 3

- 1) \$16.80
- 2) \$3210
- 3) 9%
- 4) \$5000
- 5) interest: \$253.75 ; future value: \$6253.75
- 6) amount in account: \$9751.96; interest earned: \$1751.96
- 7) \$36,057.53
- 8) \$7996.38
- 9) 6.2%
- 10) 7.23%; 7.25%; 7.25% compounded annually
- 11) \$19,500; \$6500
- 12) \$4321; \$51,852 from deposits and \$30,148 from interest
- 13) \$2347; \$46,940 from deposits and \$5060 from interest
- 14) a. down payment: \$37,500  
b. amount of mortgage: \$212,500  
c. points paid at closing: \$4250  
d. total cost of interest over 20 years: \$167,742
- 15) 35
- 16) 35,152
- 17) 362,880
- 18) 6720
- 19) 504
- 20) 504
- 21) Permutations, because the order of the prizes awarded matters.
- 22) 210
- 23) 84
- 24)  $\frac{227}{979}$ ; 0.232
- 25)  $\frac{3}{4}$
- 26) C
- 27) The oldest attorney is 72 years old. The youngest attorney is 29 years old.
- 28) D
- 29) B
- 30) 47.17
- 31) 6.62
- 32) 92.5
- 33) 1.4
- 34) 1.3
- 35) 71
- 36) a. mean = 79.8, median = 92, mode = 96, midrange = 65.5  
b. mode  
c. mean