MATH 103: Test 3
60 minutes [100 points] Name_____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the problem that involves probabilities with events that are not mutually exclusive.**

1) There are 28 chocolates in a box, all identically shaped. There are 7 filled with nuts, 12 with caramel, and 9 are solid chocolate. You randomly select one piece, eat it, and then select a second piece. Find the probability of selecting 2 solid chocolates in a row. 1) _____

A) $\frac{9}{98}$ B) $\frac{1}{84}$ C) $\frac{2}{21}$ D) $\frac{81}{784}$

2) The physics department of a college has 10 male professors, 8 female professors, 16 male teaching assistants, and 13 female teaching assistants. If a person is selected at random from the group, find the probability that the selected person is a teaching assistant or a female. 2) _____

A) $\frac{24}{47}$ B) $\frac{37}{47}$ C) $\frac{29}{47}$ D) $\frac{21}{47}$

**Evaluate the factorial expression.**

3) $\frac{10!}{(10-3)!}$ 3) _____

A) 360 B) 10,080 C) 604,800 D) 720

**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.**

4) P = \$900.00 4) _____
r = 5%
t = 5 months

A) \$918.75 B) \$225.00 C) \$1125.00 D) \$18.75

**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.**

5) P = $160
r = 8%
t = 3 years
5) _____
A) $1038.40 B) $198.40 C) $172.80 D) $184.00

**Solve the problem.**

6) Jeans with an original price of $55 are on sale at 15% off. What is the sale price of the jeans? (Round to the nearest cent, if necessary.)
6) _____
A) $54.18 B) $63.25 C) $46.75 D) $8.25

7) From 10 names on a ballot, a committee of 3 will be elected to attend a political national convention. How many different committees are possible?
7) _____
A) 360 B) 604,800 C) 120 D) 720

8) A mother invests $3000 in a bank account at the time of her daughter's birth. The interest is compounded quarterly at a rate of 6%. 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?
8) _____
A) $14,400.00 B) $592.32 C) $2369.28 D) $9871.99

9) A dress regularly sells for $79. The sale price is $58. Find the percent decrease of the sale price from the regular price.
9) _____
A) 36.2% B) 276.2% C) 73.4% D) 26.6%

10) The price of a home is $450,000. The bank requires a 20% down payment. After the down payment, the balance is financed with a 20–year fixed–rate mortgage at 8.5%. Determine the monthly mortgage payment (excluding escrowed taxes and insurance) to the nearest dollar.
10) _____
A) $3139 B) $3112 C) $3124 D) $3224

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

11) In a contest in which 10 contestants are entered, in how many ways can the 3 distinct prizes be awarded? 11) _____

A) 1,209,600 B) 86,400 C) 604,800 D) 720

**Use the Fundamental Counting Principle to solve the problem.**

12) You want to arrange 6 of your favorite CD's along a shelf. How many different ways can you arrange the CD's assuming that the order of the CD's makes a difference to you? 12) _____

A) 30 B) 120 C) 720 D) 36

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

13) ${}_8C_3$ 13) _____

A) 240 B) 168 C) 56 D) 6720

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

14) ${}_9P_4$ 14) _____

A) 90,720 B) 3024 C) 15,120 D) 362,880

**Use the theoretical probability formula to solve the problem. Express the probability as a fraction reduced to lowest terms.**

15) A single die is rolled twice. The set of 36 equally likely outcomes is {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6),}. Find the probability of getting two numbers whose sum is greater than 10. 15) _____

A) $\frac{5}{18}$ B) $\frac{1}{12}$ C) $\frac{1}{18}$ D) 3

**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.**

16) A = $195.00 16) _____
r = 10%
t = 3 years
A) $150 B) $157 C) $153.100 D) $153

**Find the value of the annuity. Round to the nearest cent.**

17) Periodic Deposit: $1000 at the end of each year 17) _____
Rate: 4.5% compounded annually
Time: 8 years
A) $9380.01 B) $8019.15 C) $31,602.24 D) $3024.14

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

18) You are taking a multiple–choice test that has 8 questions. Each of the questions has 3 choices, with one correct choice per question. If you select one of these options per question and leave nothing blank, in how many ways can you answer the questions? 18) _____
A) 24 B) 6561 C) 512 D) 11

19) An apartment complex offers apartments with four different options, designated by A through D. 19) _____

A = number of bedrooms (one through four)
B = number of bathrooms (one through three)
C = floor (first through fifth)
D = outdoor additions (balcony or no balcony)

How many apartment options are available?

A) 240 B) 14 C) 120 D) 16

**Express the fraction as a percent.**

20) $\frac{31}{80}$ 20) _____

A) 38.75 % B) 3.88 % C) 2.58 % D) 25.81 %

1) C
2) B
3) D
4) D
5) B
6) C
7) C
8) D
9) D
10) C
11) D
12) C
13) C
14) B
15) B
16) A
17) A
18) B
19) C
20) A

1) _____
2) _____
3) _____
4) _____
5) _____
6) _____
7) _____
8) _____
9) _____
10) _____
11) _____
12) _____
13) _____
14) _____
15) _____
16) _____
17) _____
18) _____
19) _____
20) _____