Review for final exam Math 118 Fall 2016

Name_____

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

Let p represent the statement, "Jim plays football", and let q represent the statement "Michael plays basketball". Convert the compound statement into symbols.

1) Jim does not play football and Michael plays basketball.   1) _____
   A) ~p ∨ q   B) ~p ∧ q   C) p ∧ q   D) ~(p ∧ q)

2) It is not the case that Jim does not play football and Michael does not play basketball.   2) _____
   A) ~(~p ∨ ~q)   B) ~p ∧ ~q   C) ~(~p ∧ ~q)   D) ~(p ∨ q)

Convert the symbolic compound statement into words.

3) p represents the statement "It's raining in Chicago."   3) _____
   q represents the statement "It's windy in Boston."
   Translate the following compound statement into words:
           p ∨ q

   A) It's not the case that it's raining in Chicago and windy in Boston.
   B) It's raining in Chicago or it's windy in Boston.
   C) If it's raining in Chicago, it's not windy in Boston.
   D) It's raining in Chicago and it's windy in Boston.

Write a negation for the statement.

4) She earns more than me.   4) _____
   A) She does not earn less than me.   B) She earns the same as me.
   C) She earns less than me.   D) She does not earn more than me.

5) No fifth graders play soccer.   5) _____
   A) No fifth grader does not play soccer.   B) At least one fifth grader plays soccer.
   C) Not all fifth graders play soccer.   D) All fifth graders play soccer.

Let p represent a true statement and let q represent a false statement. Find the truth value of the given compound statement.

6) ~[~p ∨ (~q ∧ p)]   6) _____
   A) True   B) False

7) ~[(~p ∧ ~q) ∨ ~q]   7) _____
   A) False   B) True

Construct a truth table for the statement.

8) ~r ∧ ~p

A)

r	p	(~r ∧ ~p)
T	T	F
T	F	T
F	T	T
F	F	T

B)

r	p	(~r ∧ ~p)
T	T	F
T	F	F
F	T	F
F	F	T

C)

r	p	(~r ∧ ~p)
T	T	T
T	F	F
F	T	F
F	F	T

D)

r	p	(~r ∧ ~p)
T	T	F
T	F	F
F	T	F
F	F	F

8) _____

Write the compound statement in symbols.
Let r = "The food is good."
   p = "I eat too much."
   q = "I'll exercise."

9) If the food is good and I eat too much, then I'll exercise.

A) r ∧ (p → q)   B) p → (r ∧ q)   C) (r ∧ p) → q   D) r → (p ∧ q)

9) _____

Given p is true, q is true, and r is false, find the truth value of the statement.

10) (~p ∧ q) → ~r

A) True   B) False

10) _____

Write the negation of the conditional. Use the fact that the negation of p → q is p ∧ ~q.

11) If you give your hat to the doorman, he will give you a dirty look.

A) You do not give your hat to the doorman and he will not give you a dirty look.
B) If you give your hat to the doorman he will not give you a dirty look.
C) You do not give your hat to the doorman and he will give you a dirty look.
D) You give your hat to the doorman and he will not give you a dirty look.

11) _____

Write the converse, inverse, or contrapositive of the statement as requested.

12) Love is blind.

Contrapositive
A) If it is not love, it is not blind.   B) If it is blind then it is love.
C) If it is not blind, then it is not love.   D) If it is blind then it is not love.

12) _____

13) If you like me, then I like you.

Converse
A) If you don't like me, I don't like you.   B) I like you if you don't like me.
C) I don't like you if you don't like me.   D) If I like you, then you like me.

13) _____

Use an Euler diagram to determine whether the argument is valid or invalid.

14) All cats like fish.
    Henry does not like fish.
    Henry is not a cat.
    A) Valid   B) Invalid

14) _____

15) All businessmen wear suits.   15) _____
    Aaron wears a suit.
    Aaron is a businessman.
      A) Valid   B) Invalid

Given a group of students: G = {Allen, Brenda, Chad, Dorothy, Eric} or G = {A, B, C, D, E}, list and count the different ways of choosing the following officers or representatives for student congress. Assume that no one can hold more than one office.

16) Four representatives   16) _____
      A) ABCD, ABCE, ACDE, ADEB, BCDE, BCEA, BDEA, CABD, CEDB, DACE; 10
      B) ABCD, ABCE, ACDE, ADEB, BCDE; 5
      C) ABCD; 1
      D) ABCD, ABCE, ACDE, ADEB; 4

17) A president, a secretary, and a treasurer, if the president must be a woman and the other two must   17) _____
    be men
      A) BAC, BAE, BCE, DAC, DAE, DCE, BCA, BEA, BEC, DCA, DEA, DEC; 12
      B) ABD, CBD, EBD; 3
      C) BAC, BAE, BCE, DAC, DAE, DCE; 6
      D) BAC, BAE, DAC, DAE; 4

Evaluate the factorial expression.

18) $\dfrac{7!}{5!\,2!}$ 18) _____

      A) 42   B) 7   C) 1   D) 21

Solve the problem.

19) At a lumber company, shelves are sold in 4 types of wood, 2 different widths and 5 different   19) _____
    lengths. How many different types of shelves could be ordered?
      A) 30   B) 11   C) 40   D) 32

20) A baseball manager has 10 players of the same ability. How many 9 player starting lineups can he   20) _____
    create?
      A) 90   B) 10   C) 3,628,800   D) 362,880

Evaluate the expression.

21) $32^{C}6$ 21) _____
      A) 906,192   B) 863,040   C) 992   D) 29,760
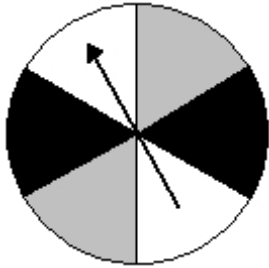
Solve the problem.

22) There are 13 members on a board of directors. If they must form a subcommittee of 5 members,   22) _____
    how many different subcommittees are possible?
      A) 371,293   B) 154,440   C) 1287   D) 120

23) How many ways can a president, vice-president, secretary, and treasurer be chosen from a club   23) _____
    with 8 members? Assume that no member can hold more than one office.
      A) 24   B) 32   C) 1680   D) 70

24) A student is told to work any 6 out of 10 questions on an exam. In how many different ways can he complete the exam? (The correctness of his answers has no bearing.) 24) _____
    A) 1,000,000   B) 24   C) 5040   D) 210

25) If you toss four fair coins, in how many ways can you obtain at least one head? 25) _____
    A) 15 ways   B) 5 ways   C) 16 ways   D) 4 ways

26) If you toss five fair coins, in how many ways can you obtain at least one head? 26) _____
    A) 32 ways   B) 31 ways   C) 15 ways   D) 16 ways

Give the probability that the spinner shown would land on the indicated color.

27) black 27) _____

    A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) $\dfrac{1}{6}$ D) $\dfrac{1}{3}$
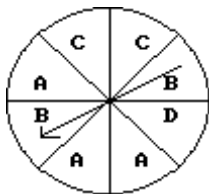
Solve the problem.

28) The table shows the number of college students who prefer a given pizza topping. 28) _____

toppings	freshman	sophomore	junior	senior
cheese	10	10	25	26
meat	23	26	10	10
veggie	10	10	23	26

Find the empirical probability that a randomly selected student prefers meat toppings.
    A) 0.110   B) 0.330   C) 0.333   D) 0.340
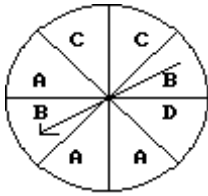
29) 29) _____

What are the odds in favor of spinning an A on this spinner?
    A) 6:2   B) 2:6   C) 3:5   D) 4:2

30)

What are the odds against spinning a D on this spinner?

A) 8:1   B) 1:7   C) 6:1   D) 7:1

Find the probability.

31) A fair die is rolled. What is the probability of rolling an odd number or a number less than 3?

A) $\frac{2}{3}$ B) 1   C) $\frac{5}{6}$ D) $\frac{1}{2}$

Find the indicated probability.

32) The age distribution of students at a community college is given below.

Age (years)	Number of students (f)
Under 21	400
21-25	403
26-30	219
31-35	56
Over 35	29
	1107

A student from the community college is selected at random. Find the probability that the student is between 26 and 35 inclusive. Round approximations to three decimal places.

A) 0.248   B) 0.198   C) 0.051   D) 275

Find the probability.

33) What is the probability that 19 tosses of a fair coin will show 8 heads?

A) 0.0288   B) 0.1442   C) 0.2884   D) 0.0721

Solve the problem.

34) If 5 apples in a barrel of 25 apples are rotten, what is the expected number of rotten apples in a random sample of 2 apples?

A) $\frac{2}{5}$ B) $\frac{4}{5}$ C) 1   D) $\frac{3}{5}$

35) Find the expected number of girls in a family of 7.

A) 3   B) 3.5   C) 4   D) 3.25

Use the given data to construct a frequency and relative frequency distribution.

36) A medical research team studied the ages of patients who had strokes caused by stress. The ages of 34 patients who suffered stress strokes were as follows.

29 30 36 41 45 50 57 61 28 50 36 58
60 38 36 47 40 32 58 46 61 40 55 32
61 56 45 46 62 36 38 40 50 27

Construct a frequency and relative frequency distribution for these ages. Use 8 classes beginning with a lower class limit of 25.

A)

Age x	Frequency f	Relative Frequency f/n
25-29	3	3/34 ≈ 9%
30-34	3	3/34 ≈ 9%
35-39	6	6/34 ≈ 18%
40-44	4	4/34 ≈ 12%
45-49	5	5/34 ≈ 15%
50-54	3	3/34 ≈ 9%
55-59	5	5/34 ≈ 15%
60-64	5	5/34 ≈ 15%

B)

Age x	Frequency f	Relative Frequency f/n
25-29	3	3/100 = 3%
30-34	3	3/100 = 3%
35-39	6	6/100 = 6%
40-44	4	4/100 = 4%
45-49	5	5/100 = 5%
50-54	3	3/100 = 3%
55-59	5	5/100 = 5%
60-64	5	5/100 = 5%

C)

Age x	Frequency f	Relative Frequency f/n
25-29	3	3/34 ≈ 9%
30-34	3	3/34 ≈ 9%
35-39	7	7/34 ≈ 21%
40-44	4	4/34 ≈ 12%
45-49	4	4/34 ≈ 12%
50-54	3	3/34 ≈ 9%
55-59	5	5/34 ≈ 15%
60-64	5	5/34 ≈ 15%

D)

Age x	Frequency f	Relative Frequency f/n
25-30	4	4/34 ≈ 12%
30-35	3	3/34 ≈ 9%
35-40	6	6/34 ≈ 18%
40-45	4	4/34 ≈ 12%
45-50	5	5/34 ≈ 15%
50-55	3	3/34 ≈ 9%
55-60	5	5/34 ≈ 15%
60-65	5	5/34 ≈ 15%

Find the mean of the set of data.

37) 13, 12, 2, 4, 10, 15, 7, 9

A) 22   B) 9   C) 10.29   D) 8

Find the median.

38) 17, 22, 35, 47, 63, 72, 90

A) 63   B) 35   C) 47   D) 49

Find the mode or modes.

39) 20, 27, 46, 27, 49, 27, 49

A) 49   B) 46   C) 35   D) 27

Find the standard deviation. Round to one more place than the data.

40) 7, 5, 16, 16, 18, 5, 17, 17, 16

A) 6.0   B) 5.2   C) 1.6   D) 5.6

Solve the problem.

41) Which score has the better relative position: a score of 52 on a test for which the mean is 43 and the standard deviation is 10, a score of 3.3 on a test for which the mean is 2.6 and the standard deviation is 0.7 or a score of 356.2 on a test for which the mean is 337 and the standard deviation is 48?

   A) The scores have the same relative position.
   B) A score of 3.3
   C) A score of 356.2
   D) A score of 52

Solve.
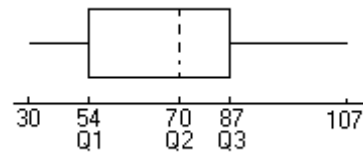
42) Construct a box plot from the data below.

   30 35 38 39 50
   51 54 54 51 63
   65 66 69 70 73
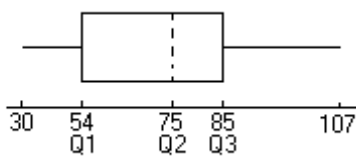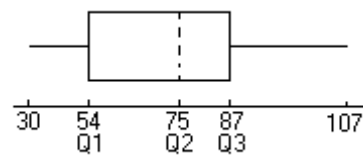   77 80 81 81 83
   85 87 89 90 93
   93 95 97 99 107

A)
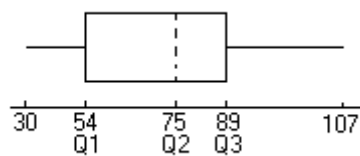
B)

C)

D)

Use the regression line to predict the value of y.

43) Nine pairs of data yield the regression equation y' = 19.4 + 0.93x. What is the best predicted value of y for x = 59?

   A) 74.3   B) 57.8   C) 64.7   D) 79.6

Find the indicated probability or percentage for the normally distributed variable.

44) A machine produces bolts with a mean diameter of 0.30 inches and a standard deviation of 0.01 inches. The diameters are approximately normally distributed. What is the probability that a randomly selected bolt will have a diameter greater than 0.32 inches?

   A) 0.477   B) 0.977   C) 0.046   D) 0.023

45) The monthly incomes of trainees at a local mill are normally distributed with a mean of $1100 and a standard deviation of $150.
Find the probability that a randomly selected trainee earns less than $900 a month.

   A) 0.092   B) 0.159   C) 0.081   D) 0.184

41) _____

42) _____

43) _____

44) _____

45) _____

46) The volumes of soda in quart soda bottles are normally distributed with a mean of 32.3 oz and a   46) _____
standard deviation of 1.2 oz. What is the probability that the volume of soda in a randomly selected
bottle will be less than 32 oz?

    A) 0.599   B) 0.382   C) 0.099   D) 0.401