MATH 1630 Name_____
Exam 2 Review Problems

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

Decide whether or not the following is a statement.

1) 8 + 5 = 14 1) _____
A) Statement B) Not a statement

2) My favorite baseball team will win the pennant. 2) _____
A) Statement B) Not a statement

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Write a negation for the statement.

3) She earns more than me. 3) _____

4) Some athletes are musicians. 4) _____

5) No fifth graders play soccer. 5) _____

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

Convert the symbolic compound statement into words.

6) p represents the statement "It's Monday." 6) _____
q represents the statement "It's raining today."
Translate the following compound statement into words:
$\sim p \wedge \sim q$

A) It's not Monday or it's not raining today.
B) It's not the case that it's Monday and raining today.
C) It's not Monday and it's not raining today.
D) It's Monday or it's raining today.

7) p represents the statement "It's Monday." 7) _____
q represents the statement "It's raining today."
Translate the following compound statement into words:
$\sim p \vee \sim q$

A) It's Monday or it's raining today.
B) It's Monday and it's raining today.
C) It's not Monday or it's not raining today.
D) It's not Monday and it's not raining today.

Decide whether the statement is true or false.

8) Every rational number is an integer. 8) _____
A) True B) False

9) Some whole numbers are not integers. 9) _____
A) True B) False

10) At least one irrational number is not an integer. 10) _____

A) True B) False

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

11) $p \wedge (q \vee p)$ 11) _____

A) False B) True

12) $\sim(p \vee \sim q)$ 12) _____

A) True B) False

Let p represent a true statement, while q and r represent false statements. Find the truth value of the compound statement.

13) $(p \wedge \sim q) \wedge r$ 13) _____

A) True B) False

14) $\sim(p \wedge q) \wedge (r \vee \sim q)$ 14) _____

A) True B) False

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a truth table for the statement.

15) $\sim r \wedge \sim s$ 15) _____

16) $\sim s \vee (\sim p \vee s)$ 16) _____

Use De Morgan's laws to write the negation of the statement.

17) Denim is out and linen is in. 17) _____

18) Roger or Emil will attend the game. 18) _____

19) It is Saturday and it is not raining. 19) _____

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

Solve the problem.

20) Given that $\sim(p \wedge q)$ is true, what can you conclude about the truth values of p and q? 20) _____

A) Both p and q are false B) Exactly one of p and q is true

C) At least one of p and q is false D) Both p and q are true

21) Given that $p \vee q$ is false, what can you conclude about the truth values of p and q? 21) _____

A) p and q have the same truth value B) Exactly one of p and q is false

C) Both p and q are false D) At least one of p and q is false

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Rewrite the statement using the <u>if...then</u> connective. Rearrange the wording or words as necessary.

22) I'll leave when he arrives. 22) _____

Write the compound statement in words.
Let r = "The puppy is trained."
p = "The puppy behaves well."
q = "His owners are happy."

23) $\sim r \rightarrow \sim q$ 23) _____

24) $r \wedge (p \rightarrow q)$ 24) _____

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

25) If I eat too much, then I'll exercise. 25) _____

26) If I exercise, then I won't eat too much. 26) _____

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

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

27) $\sim q \rightarrow (p \vee r)$ 27) _____
A) False B) True

28) $(\sim p \rightarrow \sim q) \wedge (p \rightarrow \sim r)$ 28) _____
A) False B) True

29) $\sim[(\sim q \rightarrow r) \rightarrow (q \vee r)]$ 29) _____
A) True B) False

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a truth table for the statement.

30) $r \rightarrow \sim q$ 30) _____

31) $(p \rightarrow q) \rightarrow (\sim p \vee q)$ 31) _____

32) $\sim(p \wedge q) \rightarrow \sim(p \vee q)$ 32) _____

Write the negation of the conditional. Use the fact that the negation of $p \rightarrow q$ is $p \wedge \sim q$.

33) If you give your rain coat to the doorman, he will give you a dirty look. 33) _____

34) If she doesn't study, she won't pass her math test. 34) _____

35) If you can't take the heat, stay out of the kitchen. 35) _____

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

True or false?

36) When using a truth table, the statement $q \rightarrow p$ is equivalent to $\sim q \vee p$. 36) _____
A) True B) False

37) When using a truth table, the statement $\sim q \wedge p$ is equivalent to $\sim q \rightarrow p$. 37) _____
A) True B) False

Decide whether the statement is true or false.

38) If q is false then the statement $(p \wedge q) \rightarrow p$ must be true. 38) _____
A) True B) False

39) If a conditional statement is true, its consequent must be true. 39) _____
A) True B) False

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

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

40) If I pass, I'll party. 40) _____
Contrapositive

41) If I were young, I would be happy. 41) _____
Converse

42) $q \rightarrow \sim p$ 42) _____
Inverse

Rewrite the statement in the form "if p, then q".

43) Practice is necessary for making the team. 43) _____

44) All numbers which are divisible by four are even numbers. 44) _____

45) Showing up at the party is sufficient to get a door prize. 45) _____

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

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

46) Some investments are risky. 46) _____
Real estate is an investment.
Real estate is risky.
A) Valid B) Invalid

47) All businessmen wear suits. 47) _____
Aaron wears a suit.
Aaron is a businessman.
A) Valid B) Invalid

48) All cats like fish. 48) _____
Henry does not like fish.
Henry is not a cat.
A) Valid B) Invalid

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine if the argument is valid or a fallacy. Give a reason to justify answer.

49) If I'm hungry, then I will eat. 49) _____
I'm not hungry.
I will not eat.

50) You get soup or you get salad. 50) _____
You did not get soup.
You got salad.

51) If it is cold, then you need a coat. 51) _____
You do not need a coat.
It is not cold.

52) If it rains, then the squirrels hide. 52) _____
The squirrels are hiding.
It is raining.

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

Use a truth table to determine whether the argument is valid.

53) $\sim p \rightarrow q$ 53) _____
$\sim q \rightarrow p$
$p \vee q$
A) Valid B) Invalid

54) $p \vee q$ 54) _____
q
p
A) Valid B) Invalid

Convert the number to decimal form.

55) 11101_{two} 55) _____
A) 29 B) 58 C) 22,202 D) 8

56) 11100000_{two} 56) _____
A) 6 B) 448 C) 22,200,000 D) 224

57) $137_{sixteen}$ 57) _____
A) 26 B) 311 C) 215 D) 4976

58) $AB42_{sixteen}$ 58) _____
A) 43,586 B) 43,842 C) 42,842 D) 43,840

Convert the decimal number to the given base.

59) 6784 to base sixteen 59) _____

A) $01A8_{\text{sixteen}}$ B) $1A08_{\text{sixteen}}$ C) $1A80_{\text{sixteen}}$ D) $1A81_{\text{sixteen}}$

Convert the number to binary form.

60) 15 decimal 60) _____

A) 1111_{two} B) 11110_{two} C) 111_{two} D) 1110_{two}

61) 78 decimal 61) _____

A) 101110_{two} B) 1011100_{two} C) 1001110_{two} D) 100111_{two}

1) A
2) B
3) She does not earn more than me.
4) No athlete is a musician.
5) At least one fifth grader plays soccer.
6) C
7) C
8) B
9) B
10) A
11) B
12) B
13) B
14) A
15)

r	s	(~r ∧ ~s)
T	T	F
T	F	F
F	T	F
F	F	T

16)

s	p	~s ∨ (~p ∨ s)
T	T	T
T	F	T
F	T	T
F	F	T

17) Denim is not out or linen is not in.
18) Roger will not attend the game and Emil will not attend the game.
19) It is not Saturday or it is raining.
20) C
21) C
22) If he arrives, then I'll leave.
23) If the puppy is not trained then his owners are not happy.
24) The puppy is trained, and if the puppy behaves well then his owners are happy.
25) p → q
26) q → ~p
27) B
28) B
29) B
30)

r	q	r → ~q
T	T	F
T	F	T
F	T	T
F	F	T

31)

p	q	(p → q) → (~p ∨ q)
T	T	T
T	F	T
F	T	T
F	F	T

32)

p	q	~(p ∧ q) → ~(p ∨ q)
T	T	T
T	F	F
F	T	F
F	F	T

33) You give your rain coat to the doorman and he will not give you a dirty look.
34) She doesn't study and will pass her math test.
35) You can't take the heat and do not stay out of thekitchen.
36) A
37) B
38) A
39) B
40) If I don't party, I didn't pass.
41) If I were happy, I would be young.
42) ~q → p
43) If you make the team, then you must have practiced.
44) If a number is divisible by four, then it is even.
45) If you show up at the party then you will get a door prize.
46) B
47) B
48) A
49) Fallacy by fallacy of the inverse
50) Valid by disjunctive syllogism
51) Valid by modus tollens
52) Fallacy by fallacy of the converse
53) A
54) B
55) A
56) D
57) B
58) B
59) C
60) A
61) C