

1. Write a negation for the statement: That athlete wants to be a musician.
- That musician does not want to be an athlete.
  - That musician wants to be an athlete.
  - That athlete is not a musician.
  - That athlete does not want to be a musician.
6. Use one of De Morgan's laws to write the negation of the statement: The captain of the chess team is handsome and smart.
- The captain of the chess team is not handsome and not smart.
  - The captain of the chess team is handsome or not smart.
  - The captain of the chess team is not handsome or not smart.
  - The captain of the chess team is not handsome, but he is smart.

2. Let  $p$  represent the statement "Jim plays football" and let  $q$  represent the statement "Michael plays basketball." Convert the compound statement into symbols: Jim does not play football or Michael plays basketball.
- $\sim p \vee q$
  - $p \wedge q$
  - $p \vee q$
  - $\sim (p \vee q)$
7. Let  $p$  represent "The puppy behaves well," let  $q$  represent "The puppy's owners are happy," and let  $r$  represent "The puppy is trained." Express the compound statement  $(r \wedge p) \rightarrow q$  in words.
- If the puppy is trained or the puppy behaves well, then the puppy's owners are happy.
  - If the puppy is trained, then the puppy behaves well and the puppy's owners are happy.
  - If the puppy is trained and the puppy behaves well, then the puppy's owners are happy.
  - The puppy is trained and the puppy behaves well if the puppy's owners are happy.

3. Let  $p$  represent the statement "Her name is Lisa" and let  $q$  represent the statement "She lives in Chicago." Then translate  $p \vee \sim q$  into words.
- It is not true that her name is Lisa or she lives in Chicago.
  - Her name is Lisa and she does not live in Chicago.
  - Her name is not Lisa or she lives in Chicago.
  - Her name is Lisa or she does not live in Chicago.
8. Let  $p$  represent "I eat too much," let  $q$  represent "I exercise," and let  $r$  represent "The food is good." Write the compound statement in symbols: If the food is good or I eat too much, then I exercise.
- $(r \wedge p) \rightarrow q$
  - $(r \vee p) \rightarrow q$
  - $r \rightarrow (p \vee q)$
  - $r \rightarrow p \rightarrow q$

4. Give the number of rows in the truth table for the compound statement:  $(p \vee q) \wedge (\sim r \vee s) \vee \sim t$ .
- 25
  - 10
  - 32
  - 8
9. Write the negation of the statement: If it is raining, you take your umbrella.
- It is not raining and you do not take your umbrella.
  - It is raining and you do not take your umbrella
  - If it is raining, you do not take your umbrella.
  - It is not raining and you take your umbrella.

5. Construct a truth table for the compound statement:  $w \vee (w \wedge \sim w)$ .

a) 

$w$	$w \vee (w \wedge \sim w)$
T	T
F	F

b) 

$w$	$w \vee (w \wedge \sim w)$
T	F
F	T

c) 

$w$	$w \vee (w \wedge \sim w)$
T	F
F	F

d) 

$w$	$w \vee (w \wedge \sim w)$
T	T
F	T

10. Rewrite the following statement, replacing the "or" statement with an equivalent "if ...then" statement: You can have dessert or you do not eat your dinner.
- If you eat your dinner, then you cannot have dessert.
  - If you eat your dinner, then you can have dessert.
  - If you do not eat your dinner, then you cannot have dessert.
  - If you can have dessert, then you do not eat your dinner.

11. Given: If I pass, then I'll party, write the contrapositive statement.
- a) If I don't pass, then I won't party.
  - b) If I don't party, then I won't pass.
  - c) I'll party if I pass.
  - d) If I party, then I passed.
12. Write the statement in the form "if  $p$ , then  $q$ ": Showing up at the party is sufficient to get a door prize.
- a) If you don't show up at the party, then you will not get a door prize.
  - b) If you get a door prize, then you don't have to show up at the party.
  - c) If you show up at the party, then you get a door prize.
  - d) If you got a door prize, then you showed up at the party.
13. For the given direct statement  $q \rightarrow \sim p$ , write the inverse statement.
- a)  $\sim q \rightarrow p$
  - b)  $q \rightarrow p$
  - c)  $p \rightarrow \sim q$
  - d)  $\sim p \rightarrow q$
14. Decide whether the argument is valid or invalid, and give the form (of the valid or invalid argument) that applies:

If I'm hungry, then I will eat.  
I'm not hungry.

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I will not eat.

- a) Valid; modus ponens
- b) Invalid; fallacy of the inverse
- c) Valid; modus tollens
- d) Invalid; fallacy of the converse

15. Determine whether the argument is valid or invalid:

$p \rightarrow \sim q$   
 $q \rightarrow \sim p$

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$p \vee q$

- a) Invalid
- b) Valid
- c) Neither
- d) Cannot be determined

16. Determine whether the argument is valid or invalid: If I were your friend and you were my soul mate, then I'd never stop liking you. I've stopped liking you. Therefore, I was not your friend or you were not my soul mate.
- a) Valid
  - b) Invalid
  - c) Neither
  - d) Cannot be determined

17. Use the premises to give a conclusion that yields a valid argument: Students who watch television while doing homework lower their grades. Students who lower their grades get grounded. Grounded people will not be allowed to watch television.

- a) Students who are grounded watch television while doing homework.
- b) Students who watch television while doing homework will not be allowed to watch television.
- c) Students who watch television will be grounded.
- d) Students who watch television will not be allowed to watch television.

18. Write the negation of the statement:  $\forall x[g(x) \rightarrow c(x)]$ .

- a)  $\exists x[g(x) \vee \sim c(x)]$
- b)  $\forall x[c(x) \rightarrow g(x)]$
- c)  $\forall x[g(x) \rightarrow \sim c(x)]$
- d)  $\exists x[g(x) \wedge \sim c(x)]$

19. Write the statement symbolically: No dogs can read. [ $d(x)$  means "x is a dog" and  $r(x)$  means "x can read"].

- a)  $\forall x[\sim d(x) \wedge r(x)]$
- b)  $\forall x[\sim d(x) \rightarrow r(x)]$
- c)  $\forall x[d(x) \wedge \sim r(x)]$
- d)  $\forall x[d(x) \rightarrow \sim r(x)]$

20. The argument has a true conclusion. Identify the argument as valid or invalid:

All dogs have fur.  
All cats have fur.

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A cat is not a dog.

- a) Invalid
- b) Valid
- c) Neither
- d) Cannot be determined

FALL 06

MATH 017

EX1

ITEM NO.    FORM:    A

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