

Review for Exam 2
Math 102

Complete the following exercises for a review. Questions on the exam will be similar to questions on this review, questions from the homework assignments and the suggested exercises.

- Determine whether the person in each example is using inductive or deductive reasoning.
 - John notices that if he leaves his home each day at 7:00 he will be stopped by 2 lights on his way to work. If he leaves at 6:55, he will be stopped by 3 lights on his way to work. John decides he will try to leave the house at 7:00 each day.
 - Yolanda is balancing her checkbook to make sure that he balance matches her spending for the last two weeks.
- Let s represent the statement "Steve will go to the store", b represent the statemnt "Steve will buy bread", m represent the statement "Steve will buy milk", and e represent the statement "Steve will buy eggs". Translate the following statements into symbolic form.
 - Steve will not go to the store or will not buy milk.
 - If Steve goes to the store then he will buy milk or he will buy eggs.
 - Steve will buy milk and Steve will buy bread if and only if Steve will go to the store.
 - If Steve will go to the store then he will not buy milk.
 - It is not the case that Steve will go to the store or buy milk.
 - If Steve will go to the store then Steve will not buy milk and will buy bread.
 - It is not the case that Steve will buy bread and eggs.
 - If Steve will buy eggs and bread then Steve will go to the store.
 - Steve will buy eggs if he will go to the store.
 - Steve will go to the store only if he will buy milk.
 - To buy bread it is sufficient for Steve to go to the store.
 - To go to the store it is necessary for Steve to buy milk or buy eggs.
- Rewrite statements 2e and 2g in symbolic form and in english using DeMorgan's Laws.
- Write the converse, inverse and contrapositive of statements 2d and 2h in symbolic form and in English.
- Write a sentence that is not a statement.
- Write the negation of each of the following statements in two different ways.
 - All students enjoy going to class.
 - At least one tree is native to North Dakota.
 - Some cows do not have spots.
 - Every bird does not give live birth.
- Compute a truth table for the following statements.
 - $\sim p \vee (q \wedge p)$
 - $\sim (p \rightarrow q)$
 - $[(p \rightarrow q) \wedge (\sim p)] \rightarrow \sim q$
 - $[(p \leftrightarrow q) \wedge q] \rightarrow p$
 - $(p \wedge q) \vee (q \wedge r)$
 - $(p \rightarrow r) \wedge (\sim q)$

8. State which form the following arguments follow and whether they are valid or not.
- (a) If you take the medicine then you will feel better. You do not feel better. Therefore, you did not take the medicine.
 - (b) If you go curling then you will need a coat. You do not go curling. Therefore, you do not need a coat.
 - (c) If Paul stays up past 1 am then he will be tired in the morning. Paul stays up past 1 am. Therefore, he is tired in the morning.
 - (d) Obama will be president or McCain will be president. McCain is not president. Therefore, Obama is president.
 - (e) If Thomas eats peanuts then he will have an allergic reaction. Thomas has an allergic reaction. Therefore, Thomas ate peanuts.
 - (f) If all horses are white then all people are at least 7 feet tall. If all people are at least 7 feet tall then all people will hit their heads on ceiling fans. Therefore, if all horses are white then all people will hit their heads on ceiling fans.

9. Use truth tables to determine whether the following arguments are valid.

$$(a) \frac{p \rightarrow q \quad \sim q \rightarrow r}{\therefore \sim p \rightarrow r} \qquad (b) \frac{(p \vee q) \rightarrow r \quad p \vee q}{\therefore r}$$

10. Fill in the reasons for the two column proof of the following argument.

$$\frac{(q \vee r) \rightarrow p \quad s \rightarrow q \quad \sim p}{\therefore \sim s}$$

Statement	Reason
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- (a) $(q \vee r) \rightarrow p$
- (b) $s \rightarrow q$
- (c) $\sim p$
- (d) $\sim (q \vee r)$
- (e) $\sim q \wedge \sim r$
- (f) $\sim q$
- (g) $\therefore \sim s$

11. Use Euler Diagrams to determine whether the following syllogisms are valid.

- (a) All Yetis have long hair.
The abominable snowman is a yeti.
Therefore, the abominable snowman has long hair.
- (b) All Yetis speak yeti.
Dr. Goyt is not a Yeti.
Therefore, Dr. Goyt does not speak yeti.
- (c) Some Yetis are white.
Terrence is not white.
Therefore, Terrence is not a Yeti.