

A Review Game!

Method of Scoring. If you answer a question correctly, the dollar value of that question is added to your total. If you miss a question, the dollar value is *subtracted* from your total. So think carefully before you answer! And, unlike the TV game, you may take as much time as you wish since there is no one out there about to push the buzzer before you have your answer. So, take your time, use scratch paper. You have seen all these problems before.

Instructions. Solve the problems in any order you wish. If your total at the end is more than \$3600, you will be declared **Champion!**

Important: Acrobat Reader 6.0 or later required

To Begin: Go to the next page.

Sets	Logic	Numbers

Sets

For \$100: The following are statements involving the empty set, \emptyset . Let the domain be all integers and $E(x)$ be the predicate that x is even. Which one (and there is only one) of the answers below is true?

- (a) $\exists x$ such that $E(x) \in \emptyset$
- (b) $\forall x \in \emptyset, E(x)$
- (c) $\emptyset \in \emptyset$
- (d) None of the above.

Sets

For \$200: For any three sets A, B, C is $(A - B) - C = A - (B - C)$? In other words, is this statement an identity for any three sets?

- (a) True
- (b) False

Sets

For \$300: Assume that $A = \{x \in \mathfrak{R} \mid 0 \leq x < 7\}$ and $B = \{x \in \mathfrak{R} \mid 3 \leq x < 9\}$ then $A - B =$

- (a) $\{3, 4, 5, 6, 7\}$
- (b) $\{0, 1, 2, 3, 4, 5, 6\}$
- (c) $\{0 \leq x < 3\}$
- (d) $\{3 \leq x < 7\}$

Sets

For \$400: To find the number of ways a subset of r objects can be selected from n objects, use the formula $P(n, r)$.

- (a) True
- (b) False

Sets

For \$500: How many distinct permutations can be made from the characters in the word SLIPPERS?

- (a) $11!$
- (b) $11!/2!$
- (c) $11!/(2!*2!)$
- (d) $9!$

Logic

For \$100: The logical expression $(p \rightarrow q) \vee (q \rightarrow p)$

- (a) is never true.
- (b) is a tautology.
- (c) can be true or false.

Logic

For \$200: The inference:

If you vote, your age is 18 or older.

Charles voted.

Therefore Charles is 18 or older.

is valid because of

- (a) Modus Ponens
- (b) Modus Tollens
- (c) Existential Instantiation
- (d) Universal Instantiation

Logic

For \$300: If a propositional wff can be derived using modus ponens, then its negation can be derived using modus tollens.

- (a) True.
- (b) False

Logic

For \$400: A valid predicate wff has no interpretation in which it is false.

- (a) True
- (b) False

Logic

For \$500: In the statement of the theorem "twice an odd integer is even," an existential quantifier is understood.

(a) False

(b) True

Numbers

For \$100: Assume that all variables are integers.

Is 4 is a factor of $2a * 6b$?

- (a) No
- (b) Yes

Numbers

For \$200: There is a greatest negative integer.

- (a) False
- (b) True

Numbers

For \$300: Given a certain condition about a integer n namely $4|n$, that is, 4 divides n . Then we can say

- (a) This is a sufficient condition for the number to be even.
- (b) This is a necessary condition for the number to be even.
- (c) This condition is neither necessary nor sufficient for the number to be even.

Numbers

For \$400: There are 50 workers who can either do plastering work or carpentry work, some can do both. There are 35 plasterers and 16 carpenters. How many can do both?

- (a) 1
- (b) Cannot be determined.
- (c) 0

Numbers

For \$500: How many 5 card hands can be dealt with the last card dealt being an Ace?

(a) $4 \cdot 4!$

(b) $4!$

(c) $5!$