

Math 365-100 **NEATLY PRINT NAME:** _____

Exam 1 **STUDENT ID:** _____

Summer 2006 **DATE:** _____

Scarborough **PHONE:** _____

EMAIL: _____

***"On my honor, as an Aggie, I have neither given nor received unauthorized aid on
this academic work."***

Signature of student

Academic Integrity Task Force, 2004

<http://www.tamu.edu/aggiehonor/FinalTaskForceReport.pdf>

WRITE ALL SOLUTIONS IN THE SPACE PROVIDED; FULL CREDIT WILL NOT BE GIVEN WITHOUT CORRECT ACCOMPANYING WORK. FULLY SIMPLIFY ALL ANSWERS AND GIVE EXACT ANSWERS UNLESS OTHERWISE STATED. WHERE PROVIDED, PUT YOUR FINAL ANSWER IN THE BLANK PROVIDED. POINTS WILL BE DEDUCTED FOR SPELLING ERRORS. REMEMBER YOUR UNITS!

(3pts) 1. True or False. Circle the correct answer.

- a. True or False If $ac = bc$, then $a = b$, for all real numbers a , b and c .
- b. True or False $\{8, a, *, L, \Phi, \mu\}$ has 64 proper subsets.
- c. True or False Function composition is not commutative.

Each blank is worth 2 points.

$a_4 =$ _____ 2. If $a_1 = 5$, $a_2 = 11$, and $a_n = 2 * a_{n-1} + 3 * a_{n-2}$
for $n > 2$, find a_4 .

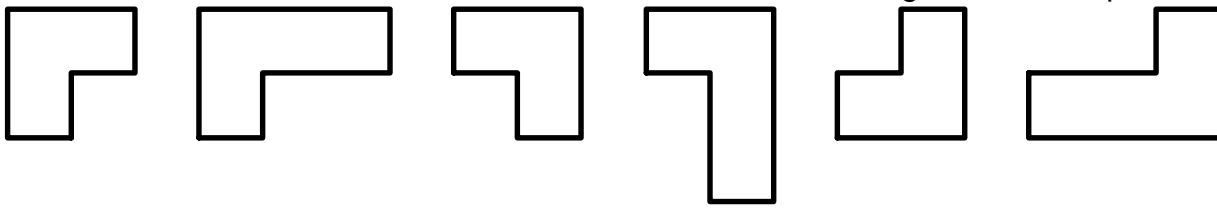
_____ 3. If m and n are natural numbers, demonstrate
the closure property of multiplication of the
natural numbers.

_____ 4. What is the
inverse to the conditional statement "If Natalie is my daughter, then she will visit me."

$a_n =$ _____ 5. Given the sequence 4, 20, 100, 500, . . . ,
what is a_n for all n ?

$(g \circ f)(x) =$ _____ 6. Given $f(x) = x - 5$ and $g(x) = -x^2 + 9$.
Find and simplify $(g \circ f)(x)$.

7. What is the next figure in the sequence?



8. Which step of Polya's 4-step Problem Solving Model is expressed in the following statement? "Instead of solving the problem for $n = 60$, let me see if I can solve the problem for $n = 5$."

9. Let $H = \{s, a, w\}$, $A = \{g, i, r, a, f, e\}$, and $P = \{s, u, n\}$. Given $U = H \cup A \cup P$, find the following.

a. _____ = $n[(H \cup P) \cap \{w, e, s\}]$

b. _____ = $P \cap A$

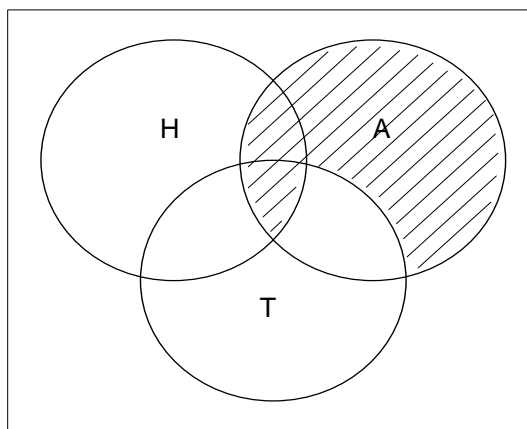
c. _____ = $\overline{H \cup A}$

d. _____ = $P \times H$

_____ 10. What is the number preceding 1000_{three} ?

_____ 11. $9T8_{\text{eleven}} - 7T9_{\text{eleven}} =$

_____ 12. What set is represented by the shaded area?



_____ 13. Negate
"No unicorn is real and some dreams come true."

_____ 14. If $n(S) = n(T) = 4$, how many 1 – 1 correspondences are there between the sets S and T?

_____ 15. Name two properties the Roman numeration system has?

_____ 16. Give a counterexample to the conjecture:
"If p is prime, then $6p + 1$ is prime."

_____ 17. Write 159 in Roman numerals.

_____ 18. Twenty-five and 7 are whole numbers but $\frac{25}{7}$ is not a whole number. Use the Division Algorithm to put this problem into the form $a = bq + r$ where a , b , q , and r are whole numbers.

(3pts) 19. Give an example thoroughly illustrating the associative property of addition of whole numbers.

(4pts) 20. Explain the relationships that exist between the four operations: addition, subtraction, multiplication and division.

(3pts) 21. Give an example of a logical statement.

(3pts) 22. Is the following argument valid or invalid? Why or why not? Draw a Venn diagram to support your answer.

Some sasas are memes.

All fifis, memes, and sasas are blings.

Some fifis are sasas.

Therefore some fifis are memes.

(4pts) 23. Using scratch addition, compute $144_{\text{five}} + 223_{\text{five}} + 34_{\text{five}} + 324_{\text{five}}$.

(3pts) 24. Use the set definition of less than to show $3 < 5$.

(4pts) 25. Make a truth table for $p \vee \sim q$. Hint: There will be 4 columns.

(5pts) 26. Find the sum of the first 33 terms of an arithmetic sequence in which the 9th term is 58 and $a_{21} = 142$.

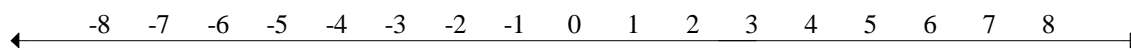
(2pts) 27. Model $10 \div 2$.

(3pts) 28. Explain, as you would to a student, why you cannot divide zero by zero.

(4pts) 29. What is 78_{nine} in base four?

(2pts) 30. Model $7 - 4$, other than using base-ten blocks.

(2pts) 31. Model $2 + 6$ on the number line.



(2pts) 32. Model $3 * 4$.

(2pts) 33. Define place value.

(3pts) 34. Model $23 - 16$ using illustrations of base-ten blocks clearly showing any regrouping/trading and the difference.

(2pts) 35. Compute $495 + 372$ using the expanded algorithm.

(4pts) 36. The sum of three consecutive odd numbers is 213. What is the largest of the three numbers?