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

Exam 2 **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."***

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***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!**

*Each blank is worth 2 points.*

______________________________ 1. Give an example of a prime number p such that $53 < p < 73$.

______________________________ 2. $2210_{six} \div 54_{six} =$

______________________________ 3. If 319 is prime, write “prime,” otherwise, prime factor it.

____________________________________ 4. Prime factor 792 using the divisibility rules to use the downward stair-step algorithm (and not the factor tree).

______________________________ 5. Completely factor $5x^4 y^2 - 180$.

______________________________ 6. What is the additive inverse of –4?

____________________________ 7. How many positive divisors does $(675)^{29}$ have?

f(x) = ______________________________ 8. Rewrite $f(x) = \begin{cases} 7 - x & if\ x \le 7 \\ x - 7 & if\ x > 7 \end{cases}$ as an absolute value function.

______________________________ 9. gcd (96, 54) =

______________________________ 10. $-7^2 - 180 \div 9 \cdot 2 - 5^0 + 40 =$

_________________________ 11. Find the least whole number greater than 150 with exactly 3 positive divisors.

_________________________ 12. lcm (168, 105, 126) =

_________________________ 13. Find (3 ⊗ 5) ⊕ 4 mod 6.

____________________ 14. Use the colored-rods model to find the lcm (4, 5).

______________________________ 15. If r is composite and r | q, find gcd(r, q).

______________________________ 16. To determine if 157 is prime or not, it is enough to check if prime numbers up to what prime number divide 157?

(7pts) 17. Formal Justification of why 37 – 14 = 23.

37 – 14

a. ______________________________ = (3 * 10 + 7 * 1) – (1 * 10 + 4 * 1)

b. ______________________________ = (3 * 10 + 7 * 1) + ¯ (1 * 10 + 4 * 1)

c. ______________________________ = (3 * 10 + 7 * 1) + (¯1 * 10 + ¯4 * 1)

d. ______________________________ = (3 * 10 + ¯1 * 10) + (7 *1 + ¯4 * 1)

e. ______________________________ = (3 + ¯1) * 10 + (7 + ¯4 ) * 1

f. ______________________________ = 2 * 10 + 3 * 1

g. ______________________________ = 23

(4pts) 18. Indicate by circling the appropriate letter whether the following properties apply to A = Addition, S = Subtraction, M = Multiplication, and D = Division *over the set of integers*.

| | | | | |
|---|---|---|---|---|
| Closed | A | S | M | D |
| Commutative | A | S | M | D |
| Associative | A | S | M | D |
| Identity Element | A | S | M | D |

(5pts) 19. Circle the numbers that divide 114,733,476.

2 3 4 5 6 8 9 10 11 12

(2pts) 20. Use partial products to calculate $T9_{twelve} * E5_{twelve}$.

(4pts) 21. Given the key below, use the chip model to illustrate and compute the following.

○ positive

● negative

a. $3 - {}^{-}5$

b. (–4)( –2)

(2pts) 22. Use scaffolding to calculate 3108 ÷ 84.

(8pts) 23. Use mental math to find the following (show your mental steps; your computations must be easy to do mentally).

a. 92 + 37 =

b. 72 – 46 =

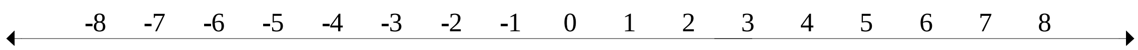
c. 37 * 5 =

d. 1664 ÷ 8 =

(2pts) 24. Use base-two blocks model and compute $10_{two} + 11_{two}$.

(2pts) 25. Use the rectangle method to find the positive divisors of 18.

(2pts) 26. Use the number line to model and compute –8 – $^{-}$6.




(4pts) 27.Compute 25 * 13 by using

a. the distributive property of multiplication over addition of whole numbers

b. base-ten blocks

(2pts) 28. Use short division to calculate 1542 ÷ 6.

(2pts) 29. Use lattice multiplication to calculate $302_{four} * 13_{four}$.

(4pts) 30. About 3540 calories must be burned to lose one pound of body weight. If ballroom dancing burns about 536 calories per hour, *estimate* to the nearest hour how many hours of ballroom dancing will it take to lose five pounds (assume all other parameters stay the same)? Show all your steps.

(3pts) 31. Use the Euclidean Algorithm and the related theorem to find lcm (136, 306).

(2pts) 32. Use the definition of less than to show –9 < –6.

(2pts) 33. Statement: If $d \nmid c$ and $d \nmid m$, then $d \nmid (c+m)$ for all integers $c$, $m$, and $d$. If the statement is true, write "true" and prove it. If the statement is false, write "false" and give a counterexample.

(2pts) 34. Name two composite double-digit numbers that are relatively prime.

(3pts) 35. Prove why you cannot divide a nonzero integer *a* by zero.

(2pts) 36. Define prime number.

(4pts) 37. a. Let $a, b \in Z$ . Prove (–a)(–b) = ab.

b. Explain why the product of two negative integers is a positive integer.