

Math 365
Exam 3
Spring 2004
Scarborough

NAME: _____
STUDENT ID: _____
DATE: _____
PHONE: _____
EMAIL: _____
SECTION: (circle one) 501 502
 9:10am 3pm

The work on this exam is my own. _____
(signature required)

WRITE ALL SOLUTIONS IN THE SPACE PROVIDED. ALL WORK TO BE
GRADED MUST BE SHOWN NEATLY IN THE SPACE PROVIDED.

(60points) Each blank is worth 4 points.

_____ 1. Fully simplify $\frac{\frac{2}{3} - \frac{3}{4}}{8 + \frac{5}{9}}$.

_____ 2. How many positive divisors does 360^7 have?

_____ 3. Arrange $\frac{-8}{35}$, $\frac{-3}{14}$, and $\frac{-2}{7}$ in increasing order.

_____ 4. Find a three-digit composite number that has only three distinct positive divisors.

5. Use the distributive property of multiplication over addition to find the product

$$\left(8\frac{2}{3}\right)\left(-5\frac{1}{4}\right).$$

6. Name two properties that the rational numbers have that the integers do not have.

_____ 7. What is the greatest number you need to check to see if 197 is prime.

_____ 8. Fully simplify $\frac{32^{100} - 2^{503} \cdot 2^0}{8^{100} \cdot 4^{100} \cdot 2^3 + 4 \cdot 16^{124}}$.

_____ 9. Insert five numbers (fractions, not decimals) between -3 and 8 so that the seven numbers together constitute an arithmetic sequence.

_____ 10. If p and q are distinct primes, find $\gcd(pq^5, p^2q^2)$.

_____ 11. Fully simplify $(7 \oplus 3) \otimes 9 \pmod{16}$.

_____ 12. Fully simplify using only positive exponents in the final answer. $\left(\frac{x-y}{(y^2-x^2)(x-y)^{-9}} \right)^{-2} \left(\frac{3x}{x^2y} \right)^4$

13. Use the Euclidean Algorithm to find the greatest common divisor of 930 and 366.

14. Use two different methods to find the least common multiple of the three numbers 135, 285, and 330. You may leave the answer as a product of powers of primes.

15. Model $\frac{2}{3} \cdot \frac{3}{5}$.

16. Find the multiplicative inverse of $3\frac{5}{6}$ as an improper fraction in lowest terms.

When changing the mixed number to an improper fraction show all your work and do not just use a rule or property. Circle the multiplicative inverse.

17. For a school craft, every 5 students are to have 2 sticks of clay. If the school has 250 students, how many sticks of clay are needed? Set up your proportion and then solve.

18. Prove $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$ where $b, c, d \neq 0$.

19. Define prime number.

20. Model $\frac{3}{4} \div \frac{1}{3}$.

21. Use the definition of less than to prove $\frac{-3}{5} < \frac{-1}{3}$.

22. If $r \in \mathcal{Q}$, prove why $\frac{r}{0}$ is undefined.