

Practice Midterm 2
Math 130

Please take the test under exam conditions. It is designed to take 75 minutes so it would be beneficial if you timed yourself. However, all of the questions are important, so if you have difficulty with some of the topics, please come get help before the actual exam!

1. Simplify the following expression algebraically in several steps. In each step state which property of arithmetic you are using.

$$(3x^2 + 3x + 4) - (2x^2 + x + 7).$$

2. Simplify the following:

(a) $\frac{(15)^{2n+m}2^{3n}5^n}{3^{n+m}10^{m-1}}$

(b) $\frac{(a^2b)^3c^2 + a^3b^3c}{a^2c^2}$

3. Label the following as expressions, equations, or neither:

(a) $x + = 2$

(b) $3a \times 2b + 5$

(c) $2x = 2x + 1$

(d) $\frac{6x + 4y - z}{0} = 2$

(e) $\frac{4y - 3q}{6} = a.$

4. Consider the division problem $\frac{8}{5} \div \frac{2}{5}$.

- (a) Write a word problem modeling this problem using the partitive interpretation of division.
- (b) Write a word problem modeling this problem using the measurement interpretation of division.

5. Write a teacher's solution to the following problem from Primary Mathematics 5A:

$\frac{3}{7}$ of the apples in a box are red apples. The rest are green apples. There are 24 green apples. How many apples are there altogether?

6. Without finding a common denominator, compare the fractions (i.e. write $<$, $>$, or $=$)

$$\frac{23}{25} \quad \square \quad \frac{63}{65}$$

and explain your reasoning.

7. Write precise mathematical definitions of the following things:
- (a) N is divisible by k ,
 - (b) $LCM(a, b)$,
 - (c) p is prime.
8. Consider a whole number N . We can write $N = p_1^{n_1} \times p_2^{n_2} \times \cdots \times p_k^{n_k}$ where the p s are the primes in N 's prime factorization and the n s are the number of times each prime appears. Prove that if all of the n s are even (they might be different even numbers, but they are all even) then N must be a square.
9. Consider $N = 880$.
- (a) Compute the prime factorization of N and write it in exponential form.
 - (b) What is the prime factorization of N^2 ? Make sure you show your work.