Math 215 Study Sheet for Test 3

You will **not** be allowed to use a calculator on this test. Make sure that your work and reasoning is neat and clear.

1. **Without** actually calculating any answers, insert the correct symbol ($<, >$, or $=$). You are to use the strategies that we have used in class. **Briefly, but clearly, explain your reasoning.**

   (a) $\frac{2}{7} \times \frac{4}{13}$ $\frac{2}{13}$

   (b) $\frac{8}{11} \times \frac{5}{7}$ $\frac{4}{11}$

   (c) $\frac{89}{100} \times \frac{10}{13}$ $\frac{9}{13}$

   (d) $\frac{8}{9} \times \frac{11}{40}$ $\frac{2}{9}$

   (e) $\frac{7}{4} \times \frac{2}{11}$ $\frac{4}{11}$

   (f) $17 \div 3$ 5

   (g) $91 \div 10$ 10

   (h) $14.08 \div 2.9$ 4

   (i) $14.08 \div 2.9$ 200

   (j) $\frac{9}{7} \div \frac{2}{7}$ 4

   (k) $\frac{13}{8} \div \frac{1}{3}$ 2

   (l) $\frac{13}{8} \div \frac{1}{3}$ 3

   (m) $\frac{5}{11} \div \frac{8}{11}$ $\frac{1}{4}$

(n) $\frac{5}{11} \div \frac{8}{11}$ $\frac{1}{2}$

(o) $\frac{5}{11} \div \frac{8}{11}$ $\frac{3}{4}$

(p) $\frac{5}{11} \div \frac{8}{11}$ 1

2. Put the following fractions in ascending order. Use the strategies we have discussed in class. Make sure that, if asked, you could explain your thinking.

(a) $\frac{15}{14}$ $\frac{11}{10}$ $\frac{7}{6}$ $\frac{3}{2}$ $\frac{8}{7}$

(b) $\frac{4}{7}$ $\frac{4}{3}$ $\frac{2}{17}$ $\frac{2}{31}$ $\frac{4}{5}$

(c) $\frac{2}{11}$ $\frac{2}{15}$ $\frac{2}{3}$ $\frac{2}{7}$ $\frac{2}{99}$

(d) $\frac{1}{2}$ $\frac{11}{3}$ $\frac{5}{7}$ $\frac{2}{11}$ $\frac{9}{11}$

(e) $\frac{5}{6}$ $\frac{6}{5}$ $\frac{10}{11}$ $\frac{1}{3}$ $\frac{4}{15}$

(f) $\frac{11}{20}$ $\frac{7}{12}$ $\frac{3}{8}$ $\frac{1}{11}$ $\frac{2}{7}$

3. Multiply, using the area model. On the test, squares will be provided for you. Be sure to indicate the direction in which you are interpreting each problem. Also, be sure that it is clear how you used the area model to find the answer. Your answer should be clearly indicated as well.

(a) $\frac{3}{4} \times \frac{3}{4}$

(b) $\frac{2}{9} \times \frac{3}{4}$

(c) $\frac{1}{4} \times \frac{3}{8}$

(d) $\frac{2}{9} \times \frac{3}{5}$

4. John looks at two fractions. He claims that the first fraction is less than the second one because it is missing more pieces than the second one is, when comparing both fractions to 1. Is his reasoning clear, complete, convincing, and correct? Explain.

5. Sally looks at two fractions. She claims that the first fraction is greater than the second one because in the first fraction, the pieces are twice as big as the pieces in the second fraction. Is her reasoning clear, complete, convincing, and correct? Explain.

6. Chris looks at two fractions and sees that each of them, when compared to 1, has 2 extra pieces. He concludes that the fractions are therefore equal. Is his reasoning clear, complete, convincing, and correct? Explain.

7. Janet looks at a division problem in which one fraction is divided by another fraction. She says that because both of the fractions are less than 1 the quotient will be less than 1. Is her reasoning clear, complete, convincing, and correct? Explain.

8. What has to be true about the numerator and denominator of a fraction in order for the fraction to be larger than $\frac{1}{4}$?

9. Indicate whether each statement is true or false:

   (a) If you multiply a positive number a by a positive number b, the product will be larger than b.

   (b) In a division problem, if the dividend is larger than the divisor, the quotient will be larger than the divisor.

   (c) In a division problem, the quotient can never exceed both the dividend and the divisor.

   (d) If you keep multiplying $\frac{3}{4}$ by itself, eventually the product will be more than 1.

   (e) If a number has an odd number of factors, it must be a square number.

   (f) If a number has an odd number of factors, it must be an odd number.

   (g) If a number has an odd number of factors, it cannot be prime.

   (h) If the numerator of a fraction is greater than 2, the fraction is greater than $\frac{2}{3}$.

10. For each problem, indicate all correct interpretations (if any).

    (a) $\frac{3}{4} \times \frac{5}{8} =$?

        i. If I collect $\frac{5}{8}$ of $\frac{3}{4}$, how much will I have?

        ii. How many $\frac{5}{8}$ can I make with $\frac{3}{4}$?

        iii. What is $\frac{3}{4}$ of $\frac{5}{8}$?

        iv. What is $\frac{5}{8}$ of $\frac{3}{4}$?

        v. How many $\frac{5}{8}$ do I need to make $\frac{3}{4}$?

    (b) $\frac{3}{2} \div \frac{5}{8} =$?

        i. What is $\frac{3}{2}$ of $\frac{5}{8}$?

        ii. How many $\frac{5}{8}$ can I make with $\frac{3}{2}$?

        iii. How many $\frac{3}{2}$ can I make with $\frac{5}{8}$?

        iv. How many $\frac{5}{8}$ do I need to make $\frac{3}{2}$?

    (c) Insert the correct symbol ($<, >, or =$) in the blank space:

    $\frac{3}{2} \div \frac{5}{8}$ 4

        i. Will I need 4, more than 4, or less than 4 $\frac{5}{8}$'s to make $\frac{3}{2}$?

        ii. How many $\frac{5}{8}$ do I need to make $\frac{3}{2}$?

        iii. Is $\frac{3}{2}$ of $\frac{5}{8}$ less than, equal to, or greater than 4?

        iv. With $\frac{3}{2}$, can I make less than 4, more than 4, or exactly 4 groups of $\frac{5}{8}$?

11. Translate this mathematical statement into sensible English: $41 \div 10 = 4\frac{1}{10}$

12. Translate this mathematical statement into sensible English: $33 \div 7 = 4\frac{5}{7}$

13. Translate this mathematical statement into sensible English: $\frac{3}{2} \div \frac{5}{8} = 2\frac{2}{5}$

14. Use the partial quotients method (using only "1's, 2's, and 5's") to divide:

    (a) $3125 \div 12$

    (b) $15,063 \div 12$

    (c) $5922 \div 16$

    (d) $18484 \div 16$

15. Divide by decomposing as directed. After decomposing, find all quotients and remainders mentally.

    (a) $80 \div 3$, decomposing the dividend into 60 and 20

    (b) $300 \div 24$, decomposing the dividend into 240, 30,and 30

    (c) $160 \div 9$, decomposing the dividend into 100 and 60

    (d) $364 \div 9$, decomposing the dividend into 300, 40 and 24

16. Recall the locker problem. At the beginning of the scenario, all of the lockers are closed. Indicate whether each statement is true or false:

    (a) No student, after student 1, ever visits lockers that are next to each other.

    (b) Locker 27×27 is visited by an odd number of students.

    (c) The 17th locker that will be open at the end of the exercise is locker 17.

    (d) Locker 1 is the only one that has only one visitor.

    (e) All composite numbered lockers will be closed at the end of the exercise.

    (f) Student 8 visits locker 12.

    (g) Locker 853 is visited by student 3.