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## TEST 3: SPRING 2006

### MATH 221: BASIC CONCEPTS OF ELEMENTARY MATHEMATICS I

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Name \_\_\_\_\_

Instructions: Check that your test consists of 25 problems. Put your name in the space provided above. Answer each multiple choice question below. Each problem is worth 4 points with the same scoring procedure as used on the quizzes. A blank page is provided at the end of this test for your work.

1. Which of the following is *not* correct?

- (a)  $17 \equiv -2 \pmod{5}$                       (b)  $17 \equiv 7 \pmod{5}$   
(c)  $13 \equiv -2 \pmod{5}$                       (d)  $13 \equiv 33 \pmod{5}$

2. Today is Wednesday, April 19, 2006. There are 365 days this year and 365 days next year, so neither year is a leap year. What day of the week will it be on April 19, 2007?

- (a) Monday            (b) Tuesday            (c) Thursday            (d) Friday

3. Which of the following is a proper fraction?

- (a)  $\frac{8}{6}$                       (b)  $\frac{\sqrt{2}}{2}$                       (c)  $\frac{19}{18}$                       (d)  $\frac{-12}{18}$

4. Which of the following is the simplest form of  $225/315$ ?

- (a)  $\frac{3}{4}$                       (b)  $\frac{7}{9}$                       (c)  $\frac{5}{7}$                       (d)  $\frac{75}{105}$

5. What fraction of the three pizzas is missing to the right?

- (a)  $1/3$                       (b)  $1/6$   
(c)  $5/24$                       (d)  $6/25$

6. One bit is one-eighth of a Spanish dollar. A teacher asks students to start with 21 bits and to exchange the bits for whole Spanish dollars and bits. The point of such an exercise is to teach the students

- (a) unlike with English, every bit counts when doing mathematics.
- (b) how to express fractions as mixed fractions.
- (c) the commutative property of addition.
- (d) the commutative property of multiplication.

7. What equation is the figure to the right illustrating?

- (a)  $\frac{1}{4} = \frac{3}{12}$
- (b)  $\frac{1}{3} = \frac{4}{12}$
- (c)  $\frac{8}{12} - \frac{4}{12} = \frac{1}{3}$
- (d)  $\frac{4}{12} - \frac{1}{12} = \frac{1}{4}$

8. Which one of the following is the least useful in explaining to a child why the fractions  $\frac{3}{4}$  and  $\frac{6}{8}$  are equal?

9. A clerk sold three pieces of one type of ribbon to different customers. One piece was  $\frac{1}{3}$  yard long, another was  $2\frac{1}{4}$  yard long, and the third was  $3\frac{1}{2}$  yard long. What was the total length of that type of ribbon sold?

- (a)  $6\frac{1}{12}$  yards
- (b)  $6\frac{1}{6}$  yards
- (c)  $6\frac{1}{4}$  yards
- (d)  $6\frac{1}{3}$  yards

10. The following represents an equation for the sum of two rational numbers.

What is the equation that is represented?

(a)  $\frac{1}{3} + \frac{11}{12} = \frac{5}{4}$

(b)  $\frac{1}{4} + \frac{11}{12} = \frac{7}{6}$

(c)  $\frac{1}{3} + \frac{9}{12} = \frac{13}{12}$

(d)  $\frac{1}{6} + \frac{3}{4} = \frac{11}{12}$

11. Which of the following is written in decreasing order?

(a)  $\frac{-19}{31}, \frac{-7}{11}, \frac{-19}{30}$

(b)  $\frac{-19}{31}, \frac{-19}{30}, \frac{-7}{11}$

(c)  $\frac{-19}{30}, \frac{-7}{11}, \frac{-19}{31}$

(d)  $\frac{-19}{30}, \frac{-19}{31}, \frac{-7}{11}$

12. The figure to the right illustrates which of the following equations involving addition of rational numbers?

(a)  $\frac{2}{3} + \frac{1}{4} = \frac{11}{12}$

(b)  $\frac{3}{4} + \frac{1}{6} = \frac{11}{12}$

(c)  $\frac{3}{10} + \frac{8}{10} = \frac{11}{10}$

(d)  $\frac{1}{3} + \frac{3}{5} = \frac{14}{15}$

Note: In this problem, the letters “A” and “B” in the figures indicate two different shades of grey.

13. What multiplication problem is represented by the diagram below?

(a)  $\frac{1}{3} \cdot \frac{3}{4} = \frac{3}{12}$

(b)  $\frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12}$

(c)  $\frac{1}{3} \cdot \frac{1}{4} = \frac{1}{12}$

(d)  $\frac{2}{3} \cdot \frac{3}{4} = \frac{6}{12}$

14. Martha has read  $\frac{4}{5}$  of a 205-page book. How many pages does she have left to read?

- (a) 36 pages      (b) 38 pages      (c) 41 pages      (d) 44 pages

15. Which of the following is not always true? (Here,  $a$ ,  $b$ ,  $c$  and  $d$  are positive integers.)

(a)  $\frac{a}{b} \times \frac{c}{d} = \frac{a}{b} \div \frac{d}{c}$

(b)  $\frac{a}{b} + \frac{c}{d} = \frac{a+c}{b+d}$

(c)  $\frac{a}{b} \div \frac{c}{d} = \frac{a \div c}{b \div d}$

(d)  $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$

16. When discussing division with rational numbers, we referred to the number of  $a$ 's that it takes to get  $b$ . With this in mind, the number of  $\frac{1}{8}$ 's that it takes to get  $2\frac{1}{4}$  is

- (a) 18                      (b) 19                      (c) 20                      (d) 21



22. If the numbers below are arranged properly on a typical number line, which will be furthest to the right? (Note that these are negative numbers.)

- (a)  $-0.84$       (b)  $-0.804$       (c)  $-0.8399$       (d)  $-0.80399$

23. Which of the following can be written as a terminating decimal?

- (a)  $\frac{12}{1440}$       (b)  $\frac{23}{1440}$       (c)  $\frac{34}{1440}$       (d)  $\frac{45}{1440}$

24. The Venn Diagram to the right is missing the name of the bigger set of numbers that includes every number in the largest oval. What is it?

- (a) the real numbers  
(b) the irrational numbers  
(c) the imaginary numbers  
(d) the whopper numbers

25. Which of the following is true?

- (a) The decimal expansion of an irrational number cannot have a pattern.  
(b) Most real numbers are irrational.  
(c) The number  $\pi$  equals  $22/7$ .  
(d) It is possible to make a list that includes all irrational numbers.