Math 141 - Spring 2004 _____ NAME: _____
TEST II 100
Chapters 3, 4, and 5 Seat: _____

Show all your work! Partial credit is based on work shown!

9pts

1. **Without actually dividing**, use the divisibility tests to determine if 53742 is divisible by each of the following numbers.

   a. Does $9 \mid 53742$? _____ Show the **divisibility test for 9:**

   b. Does $6 \mid 53742$? _____ Show the **divisibility test for 6:**

   c. Does $4 \mid 53742$? _____ Show the **divisibility test for 4:**

3pts

2. Complete this six digit number so that it is divisible by 11. **Explain the divisibility test for 11**.

   9 6 7 2 1 __

4pts

3. How could you create a test for divisibility by 12? Write out your test, give an example with a four-digit number to illustrate that your test works.

10pts

4. a. The **prime factorization** of 84 is _____.

   b. The **prime factorization** of 231 is _____.

   c. The **greatest common factor** of 84 and 231 is _____.

   d. The **least common multiple** of 84 and 231 is _____.

5pts.

5. Show all your steps in the following addition problem and simplify your answer completely.

$$\frac{5}{84}+\frac{2}{231}=$$

_____
31

3pts

6. Is 123 a prime number? _____ Explain:

6pts

7. Rewrite each of the following with a single exponent. Include your work to show the exponential rules you used.

a. $\left(5^3\right)^4 =$ b. $\frac{8^9}{8^6} =$ c. $12^5 \bullet 3^3 \bullet 4^3 =$

3pts

8. Is the set of positive odd numbers {1, 3, 5, 7, 9, 11, **…**} **closed** for multiplication? _____
Explain:

3pts

9. Is the set of positive odd numbers {1, 3, 5, 7, 9, 11**, …**} **closed** for division? _____
Explain:

4pts

10. For each of the following, identify the property that is illustrated:

a. (7 + 2) + 3 = (2 + 7) + 3 _____

b. 3 + (5 + 9) = (3 + 5) + 9 _____

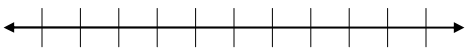
c. 5(6 + 8) = 5(6) + 5(8) _____

d. 15 + 0 = 15 _____

6pts

11. Illustrate that 2 x 3 = 6, using the following:

a. **number line** b. **set model**

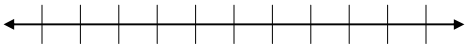


0 1 2 3 4 5 6 7 8 9 10

6pts

12. Illustrate that 6 − 2 = 4, using:

a. **number line** b. **set model**



0 1 2 3 4 5 6 7 8 9 10

8pts

13. Fill in the blanks using the **definition of division**, **writing each division equation as a multiplication equation**. (If there is no valid answer say "undefined" and show why.)

    a. $42 \div 7 =$ _____ because ____ x ____ = 42

    b. $7 \div 0 =$ _____ because _____

    c. $0 \div 7 =$ _____ because _____

    d. $0 \div 0 =$ _____ because _____

3pts

14. Fill in the blank using the **definition of less than:** $6 < 13$ because _____ .

6pts

15. Write out the steps to show how you would **mentally calculate** each of the following: Give the exact answer, not an estimate and do not use standard paper and pencil methods.

    a. 25 x 12 x 4

    b. 6 x 57 (Use the distributive property.)

6pts

16. a. **Estimate** using compatible numbers.

    8220 ÷ 91

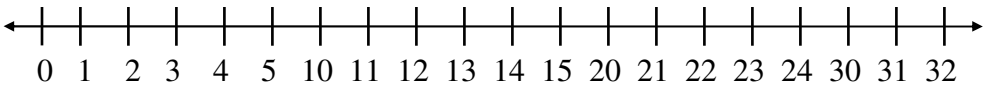
    b. Estimate using front-end with adjustment.

    1876 + 3145 + 2478

6pts

17. Jen takes 12 minutes to drive the course of a car-rally video game and return to the starting point. Joe takes 18 minutes. If they start at the same time, after how many minutes will their cars cross the starting point at the same time? _____ (Show your work and tell what strategies you used.)

18. Do each of these problems in **base six arithmetic:**
    (Use this number line to determine the necessary number facts.)



3pts

a. Subtract:

$$\begin{array}{r} 4\,1\,2 \\ -\ \underline{2\,3\,4} \end{array}$$

6pts

b. Multiply: 5 2 3 x 23 in **base six** using lattice multiplication.