MATH 320
Exam 2
Fall 1994

Name _____

Show **all** work. Be neat, clear and complete.

1. Convert:

(7) (a) 4312_{five} to base ten

(7) (b) 194_{ten} to base two

2. Perform the indicated operations:

(7) (a)

$$\begin{array}{rccc} & \text{T} & \text{E} & 8_{\text{twelve}} \\ + & 5 & 9 & 7_{\text{twelve}} \\ \hline \end{array}$$

(7) (b)

$$\begin{array}{rccccc} & 4 & 0 & 2 & 1 & 1_{\text{five}} \\ - & 3 & 2 & 3 & 3 & 3_{\text{five}} \\ \hline \end{array}$$

(7) (c)

$$\begin{array}{rcc} & 4 & 3_{\text{six}} \\ \times & 5 & 4_{\text{six}} \\ \hline \end{array}$$

(15) 3. Write an essay on the addition algorithm. Describe the algorithm and show how various properties of addition and the place-value system play a role in the algorithm. Be complete and clear, and **give as many details as possible**.

4. **Without doing the division**, find the remainder when:

(5) (a) 23987435621 is divided by 3.

(5) (b) 23987435621 is divided by 9.

(5) (c) 23987435621 is divided by 11.

(7) 5. (a) Give two different reasons to explain why we need to extend the set, W, of whole numbers to the set, Z, of integers.

(7) (b) Evaluate ${}^{-}({}^{-}3 - {}^{-}8) \cdot {}^{-}4$

(7) (c) Solve for x:

$$^{-}5x - 7 < {}^{-}22$$

(7) 6. (a) Give two different reasons to explain why we need to extend the set, Z, of integers to the set, Q, of rational numbers.

(7) (b) Evaluate:

$$\left(\frac{^{-}2}{3} + \frac{7}{5}\right) - \frac{^{-}3}{2}$$

(6) EXTRA CREDIT: Show that $\sqrt{2}$ is **not** a rational number.