MATH 102
SPRING 2012
EXAM 3

NAME:

1. [5 pts. each] Determine the sum or difference in the indicated clock arithmetic.

   (a) $6 + 7$ in clock-12 arithmetic

   (b) $4 - 10$ in clock-12 arithmetic

   (c) $4 + 4$ in clock-6 arithmetic

2. [5 pts. each] Determine what each integer is congruent to in the indicated modulo system.

   (a) 39, mod 8

   (b) $4 + 7$, mod 6

   (c) -18, mod 5

3. [10 pts. each] Determine all nonnegative solutions that are less than the modulus.

   (a) $x + 5 \equiv 3 \pmod 8$

   (b) $3x \equiv 2 \pmod 6$

   (c) $2x \equiv 4 \pmod{10}$

4. [10 pts. each] A Middle-earth pipeweed peddler drives a wagon according to the following schedule: ride 3 days from Bree to Rivendell; rest 1 day at Rivendell; ride 4 days from Rivendell to Isengard; rest 2 days at Isengard; ride 5 days back to Bree; rest 3 days at Bree. Then the cycle begins anew. If the peddler is starting his trip to Isengard today, what will he be doing...

   (a) 185 days from today?

   (b) 500 days ago?

5. [10 pts. each] Prime factor each.

   (a) 3234

   (b) 4959

6. [20 pts. each] Find the GCD and LCM.

   (a) 588 and 2079

   (b) 180, 378, and 600

7. [10 pts.] Planet Ziltoid goes once around its sun every 507 days, while planet Arizonastan completes an orbit in 390 days and distant planet Everbitter's year is 1022 days long. If all three planets are in alignment today, in how many days will they all be in alignment again in the same place?

8. [10 pts. each] Express each repeating decimal number as a quotient of integers.

   (a) 4.555555...

   (b) 2.082828282...

9. [5 pts. each] Determine whether the number is rational or irrational. Identify any repeating element.

   (a) 18.91991999199991999991999991...

   (b) 3.012112111211212121121112111211212...

   (c) 5.6843923590862345

10. [5 pts. each] State the name of the property illustrated.

    (a) $(r + s) + t = t + (r + s)$

    (b) $(7 \cdot 4) \cdot 10 = 7 \cdot (4 \cdot 10)$

11. [10 pts.] Use the Distributive Property to rewrite the expression $32\left(\frac{1}{16}x - \frac{1}{32}\right)$ without parentheses, simplifying where possible.