

**7/8 problems**

1. Compute the remainder when 3325 is divided by 97.
2. George drinks  $[\frac{4}{3}]$  cups of water each weekday and drinks  $[\frac{12}{7}]$  cups of water one each of Saturday and Sunday. How many cups of water does George drink each week?
3. Two robins just finished eating the berries off of a bush. The first flies away East at 8 miles per hour. The second flies North at 6 miles per hour. How many minutes will it take for the birds to be 25 miles apart?
4. The prime factorization of 374 is:
5. Compute  $5^3+4^2+3^1+2^0$ .
6. Solve the inequality  $|x-4| < 6$ . Write your answer in interval notation.
7. The hands of a clock are positioned at 3:42 with the hour hand pointed directly at the 3. How many degrees separate the hands in the smaller section?
8. A rectangular solid has width that is twice its height and length that is five times its height. Find the total surface area of the solid in terms of its height.
9.  $12211_3 = \quad \quad \quad_{10}$
10. If a car gets 20 miles per gallon and it is traveling at 60 miles per hour, how many gallons per minute is it using?

**9/10 problems**

1. Let  $n$  be the number of ways that 10 dollars can be changed into dimes and quarters, with at least one of each coin being used. Find  $n$ .
2. If the sum of two numbers is 1, and their product is 1, find the sum of their cubes.
3. A prime number is an integer  $p > 1$  such that 1 and  $p$  are the only positive factors of  $p$ . The digits 1,3,4,6,8, and 9 are each used exactly once to form three two-digit primes. What is the sum of the three prime numbers?
4. The sum of two numbers is 7, and their product is 25. What is the sum of their reciprocals?
5. Lena was traveling from Grand Forks to Minot by bus. When the bus had traveled half the distance, Lena fell asleep. When she awoke her distance to Minot was half the distance she had traveled while asleep. For what fraction of the trip did Lena sleep?
6. How many 7-digit numbers contain the digit 7 at least once?
7. Given a square ABCD with M and N the midpoints of sides AB and DC and  $\angle NDM = \theta$ , find the exact value of  $\sin\theta$ .

8. If  $g_1(x) = (x-2)^2$ ,  $g_2(x) = x-3$ ,  $g_3(x) = |x|$ , and  $g_4(x) = 1/x$ , find the value  $f(1)$ , where  $f(x) = g_4(g_3(g_2(g_1(x))))$ .
9. If 3 is the first term in the sequence 3,10,17,24,... which term of the sequence is equal to 129?
10. What is the value of the sum  $2^{-1}+2^{-2}+2^{-3}+\dots+2^{-9}+2^{-10}$ ?

**11/12 problems**

1. What is the remainder when  $x^6+1$  is divided by  $x-3$ ?
2. Find the center of the circle which passes through (2,0),(6,0) and (6,6).
3. Reduce  $2,690,151/9,863,887$  to lowest terms.
4. A ball of string 2 inches in radius takes 400 feet of string. What length of string is needed to make a ball which is 3 inches in radius?
5. If  $f(x) = [(x-1)/(x+1)]$  find  $f^{-1}(x)$ .
6. What is the smallest perfect square that can be expressed as the sum of three distinct nonzero squares?
7. Find a if the roots of  $x^3+ax^2+bx+c$  are the reciprocals of the roots of  $x^3+12x^2+8x+4$ .
8. If  $\sin x = 3\cos x$ , then what is  $\sin x \cos x$ ?
9. Suppose that p and q are positive numbers for which  $\log_9(p) = \log_{12}(q) = \log_{16}(p+q)$ . What is the value of  $q/p$ ?
10. Let  $f_0(x) = [1/(1-x)]$ , and  $f_n(x) = f_0(f_{n-1}(x))$ , for  $n = 1,2,\dots$  Evaluate  $f_{2001}(2000)$ .