

Miscellaneous Problem Solving and Calculation

1) Five friends are standing in a line. Cliff is standing directly behind Danny, and there are two people between Cliff and Mark. Mark is standing somewhere behind Eric, but somewhere in front of Tom. Which of the five friends is fourth in line? (1) 2004-WO1-1

2) Rene plans to open a savings account and a checking account. She has decided to deposit a total of \$45 per week, such that \$20 goes into the checking account each week and the remaining money goes into the savings account. When she has deposited a total of \$200 into her savings account, how much will she have deposited into her checking account? (1) 2004-WU8-10

3) Anna divides her collection of marbles into two equal piles. Her little sister then takes three marbles from one of the piles, leaving 28 marbles in that pile. How many marbles were in Anna's original collection of marbles? (1) 2004-WU9-3

4) When simplified, what is the value of $\sqrt{3} \times 3^{\frac{1}{2}} + 12 \div 3 \times 2 - 4^{\frac{3}{2}}$? (3) 2004-WU10-10

5) What is the maximum number of 33-cent stamps that can be purchased with \$5.00? (1) 1999-WU1-1

6) Mike drove 500 miles on his two-wheeler. He rotated a spare tire with the other tires so that all four tires got the same amount of wear. How many miles of wear did each tire accumulate? (1) 1999-WU2-5

7) Anne's digital clock read 7:15 a.m. when she left school. When she returned home 7 hours and 15 minutes later, the clock read 5:55 because the power had gone off during the day. If her clock automatically reset to 12:00 a.m. when power was restored, at what time that morning did the power return? (1) 1999-WU5-4

8) Tim and Kurt are playing a game in which players are awarded either 3 or 7 points for a correct answer. What is the greatest score that cannot be attained? (1) 1999-WU5-10

9) Angel wants to sell 50 identical pencils in groups of 2 or 3. In how many ways can the pencils be grouped? (1) 1999-WU6-1

10) A slug climbs ten inches in ten minutes. It then rests two minutes. It continues climbing at a constant rate and resting for two minutes after climbing ten minutes. How many minutes will it take the slug to reach the top of a twenty-foot tower? (1) 1999-WU7-10

11) Ben performed the following incorrect operations on a number. First, he added -5 instead of subtracting -5 . Then he multiplied his result by $\frac{1}{4}$, instead of dividing by $\frac{1}{4}$. Finally, he squared the last result instead of taking the square root. Ben's final result was $\frac{225}{16}$. If Ben had performed the correct operations, what would the result have been? (3) 1999-WU8-2

12) What is the value of the following expression? (3) 1999-WU8-10

$$\sqrt{11(\overline{.14} + \overline{.41} + \overline{.15} + \overline{.51})}$$

13) If each of the variables represents a different digit, what is the value of $a + b + c + d$? (3) 1999-WU8-3

$$\begin{array}{r} abc \\ + dca \\ \hline 1000 \end{array}$$

14) Brianna was having a party for 95 guests. Hot dogs are sold in packages of eight; buns are sold in packages of ten. If she purchased the minimum number of packages of each to guarantee at least one hot dog and one bun for each guest, how many more hot dogs than buns did she buy? (1) 1999-WU9-1

15) What is the remainder when the sum of the first 100 positive integers is divided by 9? (2) 1999-WU10-9

16) The symbols @ and * represent different operations, either $+$, $-$, $\times$ or $\div$, and x is a positive integer. Find x if $17 @ x = 54 * x$. (2) 1999-WU14-8

17) If you begin counting two consecutive whole numbers each second, starting on January 1, 2000, at 12:00 a.m., in what year will you reach 1 billion? 1999-WO4-6

18) A rental company charges \$45 per day and 35 cents per mile to rent a car. What is the maximum whole number of miles that can be driven in one day and still keep the cost less than \$125? (1) 1999-WO8-3

19) Walker Middle School sells graphing calculators to raise funds. The school pays \$90 for each calculator and sells them for \$100 apiece. They hope to earn enough money to purchase additional classroom set of 30 calculators. How many calculators must they sell to reach their goal? (1) 2002-WU1-6

20) On a 25-question multiple-choice test, Danny starts with 50 points. For each correct answer, he gains 4 points; for each incorrect answer, he loses 2 points; for each problem left blank, he earns 0 points. Danny answers 16 questions correctly and scores exactly 100 points. How many questions did he answer incorrectly? (1) 2002-WU2-8

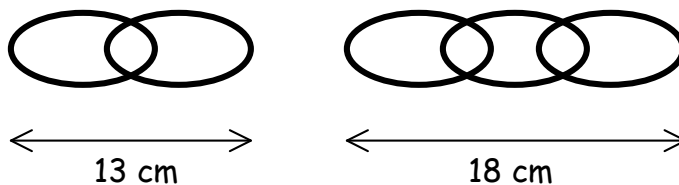
21) On Tuesday, the Beef Market sold 400 pounds of prime rib steak at \$9.98 per pound and 120 pounds of rib-eye steak at \$6.49 per pound. What was the average cost per pound of the steaks sold on Tuesday? 2002-WO1-2

22) If last month was July, then what month will it be 22 months from now? (1) 2002-WU3-1

23) An oil tanker containing 108,000 gallons of oil releases one third of its remaining volume every two hours. How many gallons have been released after the first six hours? (1) 2002-WU1-6

24) It costs 50 cents per pound for winter rye seed. Three pounds of seed are needed for 1000 square feet. There are 640 acres in one square mile. What is the cost to seed a 20-acre field? (2) 2002-WO2-2

25) A chain with two links is 13 cm long. A chain made from three links of the same type is 18 cm long. What is the length of a chain made from 25 such links? (3) 2002-WU5-4



26) Assume that it takes 20,000 more seconds for the earth to circle the sun than the length of a year in our calendar. If we did not correct with leap years, after how many full years would this discrepancy first accumulate to at least a full week? (2) 2002-WO4-7

27) The buttons for the digits 0 through 9 have been rearranged on Kyle's calculator, so that every button is on the wrong digit. Thinking that the buttons are correct, he enters the following computations and gets the following results: $47 \times 32 = 391$ and $6 \times 6 = 16$. What answer will show on the screen if Kyle enters $46 + 73$? (2) 2002-WO5-1

28) A daffodil bulb produces a second bulb every two years. As a result, one bulb becomes two bulbs in two years, four bulbs in four years and eight bulbs in six years. Mrs. Stover purchased 100 bulbs. Fifty of the bulbs are new and will produce new bulbs for the first time next year. The other bulbs are one year old and will produce bulbs for the first time next year. How many years will it be before she has at least 1000 bulbs? (1) 2002-WO6-4

29) The U.S. Mint began producing quarters for the 50 state quarter program at the beginning of 1999. After making the quarters for a given state for approximately ten weeks, the Mint begins making quarters honoring a new state. In what year will the U.S. Mint finish making the quarters honoring the 50th state? (1) 2002-WU14-4

30) Starting with the number 100, Jen repeatedly divides her number by two and then takes the greatest integer less than or equal to that number. How many times must she do this before she reaches the number 1? (1) 2002-WU17-7

31) A circular target has scoring regions of 5 and 7 points. What is the largest score that cannot be attained by throwing any number of darts at the board? (1) 2002-WU18-5

32) In how many different ways can 30 cents be made from any combination of quarters, dimes, nickels or pennies? (1)

33) What is the maximum value that can be attained from the following expression when grouping symbols are added? (1) 1997-WU3-4

$$4 + 5 \times 8 + 4 - 2 \times 3$$

34) At a chess tournament, 20 players compete. A win in this tournament is worth 1 point, a tie is worth $\frac{1}{2}$ point, and a loss is worth 0 points. Each player has five matches, each match against a different opponent. A trophy is given to any player who earns 3 or more points. Determine the greatest number of players that could earn trophies at this tournament. (3) 1997-WU9-3

35) "A plumber and his helper leave the shop at 8:20 a.m. to repair a faucet. They return at 11:10 A.M. They charge 60 cents per hour for the time the plumber is gone from the shop, half as much for his helper's time, and 85 cents for all of the materials. How much money was charged? (1) 2001-WU3-8

36) A song is written in $\frac{3}{4}$ time meaning that there are 3 beats to the measure and each quarter note gets one beat. A half note would get 2 beats and an eighth note gets $\frac{1}{2}$ beat. A practice exercise consists of 26 eighth notes, 26-quarter notes and 21 half notes played consecutively. What is the number of measures in the exercise? (2) 2001-WU17-2

37) City Cab Company charges \$1.60 plus \$0.25 per $\frac{1}{8}$ mile. The distance from the airport to the Ritz hotel is 13.25 miles. Two passengers will share the fare equally. How much money will each passenger owe? (1) 2001-WO4-6

38) Fill in the numbers 1 through 12 in the blanks so that each number is used once and all the indicated sums are correct. (2) 1993-WO8-5

$$\begin{array}{rclcl}
 \underline{\quad} & + & \underline{\quad} & = & \underline{\quad} \\
 \underline{\quad} & + & \underline{\quad} & = & \underline{\quad} \\
 \underline{\quad} & + & \underline{\quad} & = & \underline{\quad} \\
 \underline{\quad} & + & \underline{\quad} & = & \underline{\quad}
 \end{array}$$

39) In the addition problem shown, different letters stand for different digits. If the O stands for 7, what digit does W represent? (2) 1993-WO8-10

$$\begin{array}{r}
 \text{ TWO} \\
 + \text{ TWO} \\
 \hline
 \text{ FOUR}
 \end{array}$$

Miscellaneous Problem Solving and Computation – Answer Key

1) Danny

23) 76,000

2) \$160

24) \$1306.80

3) 62

25) 128 cm

4) 3

26) 31 years

5) 15

27) 55

6) 375 miles

28) 7

7) 8:35

29) 2008

8) 11

30) 6

9) 16

31) 23

10) 288

32) 18

11) 10

33) 318

12) $11\frac{1}{3}$

34) 16

13) 18

35) \$3.40

14) 4

36) 27

15) 1

37) 414.05

16) 3

38) $1 + 5 = 6$

17) 2015

 $2 + 9 = 11$

18) 228

 $3 + 7 = 10$ $4 + 8 = 12$ *plus others*

19) 270

39) 6

20) 7

21) \$9.17

22) June