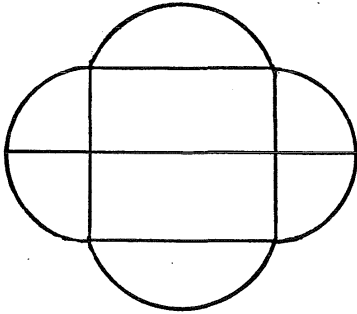


1. TODAY'S TWISTER

NAME _____

Put the numbers 1 - 8 into the boxes so that each number is used once and there are no adjoining boxes with consecutive numbers. (They may not even join at corners.)



2. TODAY'S TWISTER

NAME _____

What number has its half, its double, and its third add up to 68?

ANSWER _____

3. TODAY'S TWISTER

NAME _____

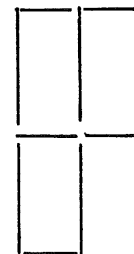
Name the two numbers which have a sum of 221 and a difference of 39.

ANSWER _____

4. TODAY'S TWISTER

NAME _____

Can you arrange the nine sticks in such a way as to have three rectangles with equal dimensions? You may move only two sticks. Practice on another paper.



TODAY'S TWISTER

5. NAME _____

There is a queen just
below a queen.

There is a jack just
above a queen.

There is a spade just
above a spade.

There is a heart just
below a spade.

Name the cards:

Card 1 _____

Card 2 _____

Card 3 _____

1

2

3

TODAY'S TWISTER

6. NAME _____

A boy had two urns; one
held exactly three quarts and
the other exactly five quarts.
His father sent him to the
well with instructions to
return with exactly four
quarts.

The sides of the urns
were not marked in any way.
How did the boy manage to
measure exactly four quarts
of water?

Put answer on back.

TODAY'S TWISTER

7. NAME _____

Ann found two dollars.
She then had five times as much
money as she would have had if
she lost two dollars.

How much money did Ann have
originally?

ANSWER _____

TODAY'S TWISTER

8. NAME _____

Sample: Write three sixes to
make six.

Ans. $6 \times 6/6$

Write three sixes to make seven.

ANSWER _____

Write four fours to make five.
You may use basic operations,
a square root symbol, parentheses,
decimal points and exponents (as
long as the exponent is a 4).

ANSWER _____

TODAY'S TWISTER

9. NAME _____

The number 9 is an intriguing one as you will discover as you fill in the blanks.

$(0 \times 9) + 1 = -$

$(1 \times 9) + 2 = --$

$(12 \times 9) + 3 = ---$

$(123 \times 9) + 4 = ----$

$(1234 \times 9) + 5 = -----$

$(12345 \times 9) + 6 = -----$

$(123456 \times 9) + 7 = -----$

$(1234567 \times 9) + 8 = -----$

$(12345678 \times 9) + 9 = -----$

$(123456789 \times 9) + 10 = -----$

TOTAL= _____

TODAY'S TWISTER

10. NAME _____

Simplify:

$$10 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 - 1/3}}}}$$

Hint: Start at the bottom and work up.

ANSWER _____

TODAY'S TWISTER

11. NAME _____

A perfect number is a number whose factors add up to that same number. The factors should not include the number itself in this case. The factors of a number include all those numbers which divide into it evenly.

The factors of 6 (excluding 6 itself) are 1, 2 and 3. Also, $1 + 2 + 3 = 6$, so 6 is a perfect number.

There is another perfect number between 15 and 30. Find it.

ANSWER _____

TODAY'S TWISTER

12. NAME _____

Into how many quarter inch cubes may a one inch cube be cut?

ANSWER _____

TODAY'S TWISTER

13. NAME _____

What number may be placed
in both boxes to make this true?
(Same number in both boxes)

$$\frac{2}{\square} = \frac{\square}{450}$$

ANSWER _____

TODAY'S TWISTER

14. NAME _____

In a list of four numbers
the average of the first two
is 15, the third number is 8,
and the average of the four
numbers is $8\frac{1}{2}$. What is the
fourth number?

ANSWER _____

TODAY'S TWISTER

15. NAME _____

The reciprocal of any number,
say n , is $1/n$ (except when $n = 0$).

By exactly how much does 1.10
exceed its reciprocal?

ANSWER _____

TODAY'S TWISTER

16. NAME _____

Move one number from one
group to another so that the sum
of the numbers in each group will
then be equal.

(Answer by using arrows or a
description of what to do
on back.)

| | | |
|---------|---------|---------|
| 1, 2, 3 | 4, 5, 6 | 7, 8, 9 |
|---------|---------|---------|

TODAY'S TWISTER

17. NAME _____

LIST AND ADD all divisors of 220 including 1 but not including 220.

(Note: For your final answer give only the sum of the divisors.)

FINAL ANSWER _____

TODAY'S TWISTER

18. NAME _____

Harry and Cary were counting their money. Harry said, "Give me one of your dollars and I'll have as many as you."

"Yes", Cary said. "But if you give me one of your dollars then I'll have twice as many as you have."

Originally, how many dollars did each person have?

ANSWER Harry:
Cary:

TODAY'S TWISTER

19. NAME _____

Mr. Barcatchem, carrying his rifle, walks directly south from a point, traveling a distance of three miles. He then walks east for three miles and at that point shoots a bear.

Upon checking his position, he finds that he is still three miles from where he started.

What color is the bear?

ANSWER _____

TODAY'S TWISTER

20. NAME _____

If an egg and bacon cost 90¢ and the bacon cost 70¢ more than the egg, how much does the bacon cost?

ANSWER _____

TODAY'S TWISTER

21.
NAME _____

Someone wants to build a square-shaped house with windows on every side, each window having a view to the south.

How may this be done?

ANSWER _____

TODAY'S TWISTER

22. NAME _____

Find two numbers whose difference and whose quotient are both equal to three.

ANSWER _____

TODAY'S TWISTER

23.
NAME _____

Simply by looking and thinking, tell which of the following could not possibly be the square of an integer:

123454321 345676543

3086358025 4444355556

1111088889

ANSWER _____

TODAY'S TWISTER

24. NAME _____

Suppose that a pond lily doubles itself every day and at the end of 37 days has half filled a 10,000 acre lake. How many days from the start does it take to fill the lake?

ANSWER _____

TODAY'S TWISTER

25. NAME _____

A prime number is divisible by no other number except one. Examples are 5, 7, 19, 41, etc.

Name:

- a. The only even prime _____
- b. A prime between 25 and 30 _____
- c. A prime between 50 and 55 _____
- d. All the primes in the nineties _____

TODAY'S TWISTER

26. NAME _____

One mathematician said "Every even number can be expressed as the sum of two primes".

Prove that this is true for each of these even numbers. That is, write the sum of two primes for each even number below. The first one is done as an example.

18 13 + 5 (or 11 + 7)

14 _____

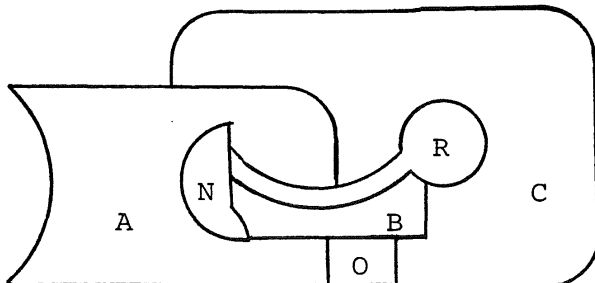
20 _____

100 _____

TODAY'S TWISTER

27. NAME _____

Below is a "map" of six countries. Only four colors may be used to color the six countries and no bordering countries may have the same color. Which of the pairs of countries listed could possibly have the same color? (Careful - only one answer is possible.)

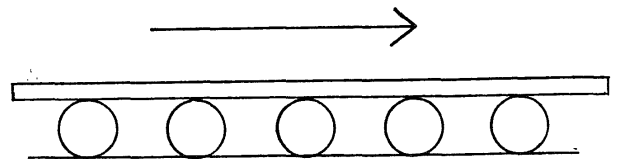


A & O A & C N & O N & R O & R

ANSWER _____

TODAY'S TWISTER

28. NAME _____



A plank is pushed forward on rollers as shown. How far does the plank advance if the rollers advance two feet?

ANSWER _____

TODAY'S TWISTER

29. NAME _____

Below is a set of pins at the end of a bowling alley designed to be struck from the "top". Cross out and rearrange the position of three pins so the group is designed to be struck from the "bottom".



TODAY'S TWISTER

30. NAME _____

Find the next number in the series.

4, 9, 17, 35, 69, _____

ANSWER _____

TODAY'S TWISTER

31. NAME _____

Try to guess the rule and use it to finish the last problems.

3, 1 → 11
 7, 3 → 55
 12, 10 → 164
 10, 12 → _____
 9, 2½ → _____
 1, 5 → _____
 3, 0 → _____
 4, _____ → 22
 _____, 20 → 45

TODAY'S TWISTER

32. NAME _____

A cryptarithm is an ordinary arithmetic problem disguised by using letters instead of numbers. You must discover what numbers are being replaced by letters.

What numbers for L, M, and N will make this addition example work?

$$\begin{array}{r} L M N \\ +6 L M \\ \hline N 5 L 0 \leftarrow (\text{zero}) \end{array}$$

ANSWER: L = _____, M = _____, N = _____

TODAY'S TWISTER

33. NAME _____

Among the coins owned by a coin collector was one dated 368 B.C. It was made of gold. Can you tell whether the coin was genuine and if so, how?

ANSWER: _____

TODAY'S TWISTER

34. NAME _____

Eight persons were in a room. Each person shook hands with each other person. How many handshakes occurred?

ANSWER _____

TODAY'S TWISTER

35. NAME _____

Braithenwald walks for three days at the rate of 12 miles per day and for 5 days at the rate of 8 miles per day. What is his average rate of walking in miles per day?

ANSWER _____

TODAY'S TWISTER

36. NAME _____

A piece of paper is colored as follows: $\frac{1}{3}$ of it is red, $\frac{1}{4}$ of it is blue, and the remaining 8 square inches are burgundy.

What was the area of the original piece of paper?

ANSWER _____

TODAY'S TWISTER

37. NAME _____

Harry bought a table tennis paddle for \$1.30 and sold it to Zinger for \$1.30. Zinger sold it back to Harry for \$1.20. Next, Harry sold the paddle again for \$1.35. How much did he make on the whole transaction?

ANSWER _____

TODAY'S TWISTER

38. NAME _____

How many times does the clock strike during a day if it strikes the correct number of times for each hour?

ANSWER _____

TODAYS TWISTER

39. NAME _____

A man planted ten trees. He had three rows of four trees each. How did he do it? Draw your answer.

TODAY'S TWISTER

40. NAME _____

In a line of girls there were 2 girls in front of a girl, 2 girls behind a girl, and there was a girl in the middle. How many girls were there (minimum number)?

ANSWER _____

TODAY'S TWISTER

41. NAME _____

There are four tents at a carnival and Betsy enters each one. It costs \$1 to enter a tent and \$1 to exit. Inside each tent Betsy spends half of what is in her pocket. When she emerges from the last tent she has no money left. How much did she have at the beginning?

ANSWER _____

TODAY'S TWISTER

42. NAME _____

If $23(\text{base } ?) = 15(\text{base ten})$, then what numeration system is the 23 written in ?

ANSWER _____

TODAY'S TWISTER

43. NAME _____

Janis determined that it took six seconds for the town hall clock to strike 6. How long will it take this clock to strike 12?

ANSWER _____

TODAY'S TWISTER

44. NAME _____

It is now 11:30. When will the hands of the clock next be at right angles with each other?

- A little before 11:45
- Exactly quarter of twelve
- A little after quarter of twelve
- exactly 12:15

ANSWER _____

TODAY'S TWISTER

45. NAME _____

If you take this number and triple it, then add 6, and finally double the result, the answer is 57. What is the number?

ANSWER _____

TODAY'S TWISTER

46. NAME _____

Write the next three numbers of each sequence.

a. 3, 8, 13, 18, __, __, __

b. 0, 1, 3, 6, 10, __, __, __

c. 0, 1, 3, 7, 15, 31, __, __, __

d. 1, 5, 14, 30, __, __, __

TODAY'S TWISTER

47. NAME _____

GROUND RULE: Same shape must contain the same number.

$$2 \times \square + \hexagon = 13$$

$$\hexagon - \square = 4$$

ANSWER: $\square = \underline{\quad}$

$$\hexagon = \underline{\quad}$$

TODAY'S TWISTER

48. NAME _____

A woman is 46 years old when her daughter is 18. How old will the woman be when she is twice her daughter's age?

ANSWER _____

TODAY'S TWISTER

49. NAME _____

If each person in a room shakes hands with each other person exactly once, how many people are in the room if there are 15 handshakes?

ANSWER _____

TODAY'S TWISTER

50. NAME _____

If you wrapped a piece of string around the earth exactly once and then made it one foot longer, which of the following would be true?

- a. You could barely slip a piece of cardboard under the string.
- b. You could just about fit an orange under the string.
- c. You could drive a car under the string.

ANSWER _____

TODAY'S TWISTER

51. NAME _____

A small purse is full of coins. If you count them by 2's, 3's, or 5's there will be 1 left over. If you count them by 7's there will be none left over. How many coins are in the purse?

ANSWER _____

TODAY'S TWISTER

52. NAME _____

The perimeter of Julie's rectangular garden is 48 feet. What are its length and width if its area is 140 square feet?

ANSWER:

length _____ ft.

width _____ ft.

TODAY'S TWISTER

53. NAME _____

Time can be strange. To what does the following refer?

I occur twice in two seconds, once in a fortnight, but not ever in a century. What am I?

ANSWER _____

TODAY'S TWISTER

54. NAME _____

If three boys can wash three cars in three hours, how long will it take four boys to wash eight cars?

ANSWER _____

TODAY'S TWISTER

55. NAME _____

Bobby lived on Ronald Road. When asked what the number of his house was he replied, "It has two digits, and when a decimal point is placed between them, the resulting number is the average of the digits in my house number".

What was Bobby's house number?

ANSWER _____

TODAY'S TWISTER

56. NAME _____

Discover what Rule a is doing to the left number to get the right-hand answer and fill the blanks.

$$5 \xrightarrow{a} 22$$

$$0 \xrightarrow{a} -3$$

$$2 \xrightarrow{a} 1$$

$$3 \xrightarrow{a} 6$$

$$1 \xrightarrow{a} \underline{\quad}$$

$$10 \xrightarrow{a} \underline{\quad}$$

$$\underline{\quad} \xrightarrow{a} 61$$

$$\underline{\quad} \xrightarrow{a} 13$$

TODAY'S TWISTER

57. NAME _____

Two bicycle riders are 25 miles apart. One is traveling 15 mile per hour and the other 10 miles per hour. A bee starts from the front tip of the handlebars of one bike and flies to the front tip of the handlebars of the other and then back and forth from tip to tip, always flying at the rate of 20 miles per hour as the bicycles approach each other. How far did the bee fly before the cyclists met?

ANSWER _____

TODAY'S TWISTER

58. NAME _____

Suppose that the following statement is true: "If Harry is happy then Sally is sad." What definite conclusion can you draw (if any) if:

- a. Harry is happy.
- b. Harry is not happy.
- c. Sally is sad.
- d. Sally is not sad.

ANSWERS:

- a. _____
- b. _____
- c. _____
- d. _____

TODAY'S TWISTER

59. NAME _____

A fence 20 feet long requires four posts. How long would a similar fence be which contains 10 posts?

ANSWER _____

TODAY'S TWISTER

60. NAME _____

1 2 3 4 5 6 7 8 9

There are different ways in which the above numbers can be connected to total 99 without changing their order. One solution is:

$$1 + 23 + 45 + 6 + 7 + 8 + 9$$

Try to find another which, like the example given, uses only addition.

ANSWER _____

TODAY'S TWISTER

61. NAME _____

Use the number 3 five times
to form the number 31.

ANSWER: _____

TODAY'S TWISTER

62. NAME _____

A circular target with concentric rings has the following numbers printed on it, one in each ring:

16, 17, 23, 24, 36, 40

Tell how exactly 100 could be scored using no more than 6 arrows.

ANSWER: _____

TODAY'S TWISTER

63. NAME _____

a. If 13.2 (base y) = $9 \frac{1}{3}$ (base ten),
what number is represented by y ?

ANSWER _____

b. If 0.13 (base n) = $\frac{4}{27}$ (base ten),
then $n =$ _____

TODAY'S TWISTER

64. NAME _____

Give the letter of each which is not divisible by 4:

a. 4^{30} b. 30^4 c. 4^{35} d. 35^4 e. $17^{50} + 17^{50} + 17^{50} + 17^{50}$ f. 17^{50} g. $4^{(20 - 2)}$ h. $4^{20} - 2$

ANSWER _____

TODAY'S TWISTER

65. NAME _____

If $4^* = 6$, $9^* = 16$, and $50^* = 98$,then $2 + (3)^* + (2 + 3)^* = ??$

ANSWER _____

TODAY'S TWISTER

66. NAME _____

How many busses will I pass coming from the opposite direction when I go from bus stop A to bus stop B if busses leave each station every ten minutes and the trip takes one hour. Count the bus pulling into A as I leave and leaving B as I arrive.

ANSWER _____

TODAY'S TWISTER

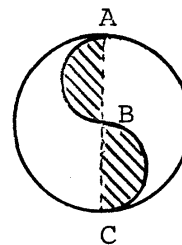
67. NAME _____

A bus left Atlanta, Georgia, at 4:00 A.M. and drove toward New York City at 55 miles per hour. At 5:00 A.M. the same day a bus left New York City and drove toward Atlanta at 50 miles per hour. At the instant that the drivers passes each other, which one was closer to New York?.

ANSWER _____

TODAY'S TWISTER

68. NAME _____



ABC is a diameter of the large circle with B as its center. Find the area of the shaded S - shaped figure if the area of the large circle is 88 sq. units.

ANSWER _____ sq. units

TODAY'S TWISTER

69. NAME _____

If a driver had increased his speed by one-fourth, he would have made his trip in 16 hours. As it was, how long did it take him to make the trip?

ANSWER _____

TODAY'S TWISTER

70. NAME _____

Write 30 using three equal single digits and any basic operation symbols, including exponents.

ANSWER _____

TODAY'S TWISTER

71. NAME _____

If there are 16 stations on a railroad, how many different tickets are required to connect every station with every other station?

ANSWER _____

TODAY'S TWISTER

72. NAME _____

If a woman buys a half dozen eggs each week for two weeks and then one dozen each week for three weeks, on the average, how many eggs does she use per week?

ANSWER _____

73. TODAY'S TWISTER

NAME _____

Three men at 6:00 A.M. started to dig two holes. One of them, work-alone, completed his hole, 3x3x3, in one hour. The other two, each working at the same speed as the first, made their hole 6x6x6. How long did it take them?

ANSWER _____

TODAY'S TWISTER

74. NAME _____

Remembering that:

Odd no. + even no. = odd no.
 Odd no. + odd no. = even no.
 Even no. + even no. = even no.

What are the chances, given a pair of identical twelve sided dice with any consecutive 12 numbers printed on their faces, that a total which is an even number will be rolled?

ANSWER _____

TODAY'S TWISTER

75. NAME _____

Julie's garden with perimeter 54 ft. and width 12 ft. is to have posts put around it 3 feet away from the garden's edge on all sides. They are also to be three feet apart. How many posts will she need?

ANSWER _____

TODAY'S TWISTER

76. NAME _____

Use four 7's to express the number 87.

Sample: $77/7 - 7 = 4$
 (not right for 87)

Decimal points and parentheses may also be used.

ANSWER _____

TODAY'S TWISTER

77. NAME _____

Eleventeen and $\frac{2}{3}$ of eleventeen
is what part of $\frac{7}{3}$ of eleventeen?

ANSWER _____

TODAY'S TWISTER

78. NAME _____

Some very tricky conclusions
about repeating decimals!

True or false

a. $.2 + .7 = .9$ _____

b. $.\overline{2} + .\overline{7} = .\overline{9}$ _____

c. $\frac{2}{9} + \frac{7}{9} = \frac{9}{9}$ _____

d. $\frac{9}{9} = 1$ _____

e. $.\overline{9} = 1$ (exactly) _____

TODAY'S TWISTER

79. NAME _____

Janis says that three men
can build a garage in 4 days, and
if it takes ten boys to do the work
of four men, how long will it take
two men and three boys to build the
garage?

ANSWER _____

TODAY'S TWISTER

80. NAME _____

Roger noted that there is
a cube which has the same num-
ber of square units in its sur-
face area as it has cubic units
in its volume. How many units
in the length of the edge of
the cube?

ANSWER _____

TODAY'S TWISTER

81. NAME _____

Leslie got up early one morning to deliver newspapers. It was still dark outside and none of the lights in the room would work. Leslie knew that there were 10 red socks and 4 white socks in the dresser drawer. What is the minimum number of socks that leslie has to pull out of the drawer in the dark to be sure that there are at least two that match?

ANSWER _____

TODAY'S TWISTER

82. NAME _____

If a goose and a half can lay an egg and a half in a day and a half, how many eggs can seven geese lay in six days?

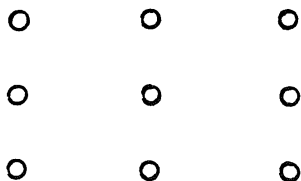
ANSWER _____

TODAY'S TWISTER

83. NAME _____

Connect these nine dots with only four straight lines without lifting your pencil from the paper.

Practice on another paper.

TODAY'S TWISTER

84. NAME _____

Let \hexagon{n} mean $2xn - 3$
and let \triangle{n} mean $n^2 + 1$.

What value of y will make the following true?

$$\triangle{\frac{1}{3}} \cdot y = 1$$

ANSWER _____

TODAY'S TWISTER

85. NAME _____

Two cowboys were complaining about their horses, each insisting that his own horse was slower than his partner's. To settle the matter they agreed to a race in which the horse to cross the finish line last would be declared the winner, having proved to be the slower.

They started to race across the Arizona desert but soon slowed to a complete stop, each rider being reluctant to prove himself wrong. They dismounted and explained their dilemma to a passing man who made a suggestion, whereupon the men immediately mounted and raced for the finish line. What was the suggestion?

ANSWER _____

TODAY'S TWISTER

86. NAME _____

List each number which will make this sentence true (same number in all boxes at one time).

$$\frac{2}{\square - 2} = \frac{\square}{\square - 2}$$

ANSWER _____

TODAY'S TWISTER

87. NAME _____

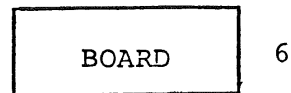
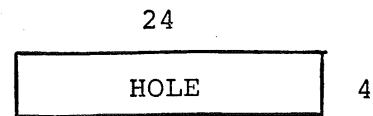
In the bottom of a well 33 feet deep there was a frog who began to travel toward the top. In his journey he ascended three feet each day and slipped back two feet each night. In how many days did he get out of the well?

ANSWER _____

TODAY'S TWISTER

88. NAME _____

How can this board be cut into two pieces so it will exactly cover the hole? Draw the cut line and label its dimensions.



16

TODAY'S TWISTER

89. NAME _____

Let \textcircled{n} mean $(n + 2)^2$,

Let $\triangle n$ mean $n^2 + 2$, and

Let \boxed{n} mean $n - 5$.

Enclose (-1) within three shapes, not necessarily different shapes, so as to produce the largest possible result and tell what that result is. Example (not the right one!):

$$\textcircled{\boxed{\triangle(-1)}} = 4$$

Hint: It's possible to produce a value much larger than 500.

ANSWER: _____ produces _____

TODAY'S TWISTER

90. NAME _____

What number is just as much less than 92 as its triple is more than 92?

ANSWER _____

TODAY'S TWISTER

91. NAME _____

$4!$ (called "4 factorial") = $4 \times 3 \times 2 \times 1 = 24$
 $10!$ = $10 \times 9 \times 8 \times \dots \times 3 \times 2 \times 1 = 3628800$

Compute:

a. $8!$

b. $\frac{98!}{96!}$ (Try to think of a shortcut.)

ANSWERS: a. _____

b. _____

TODAY'S TWISTER

92. NAME _____

Tom, Dick and Harry were on a camping trip. Tom brought out a bag of cherries for an evening snack just as the other boys were falling asleep. Tom ate his share and fell asleep. Later, Dick woke up, ate what he thought to be his share and fell asleep. Then Harry awoke, ate what he thought to be his share, and fell asleep. Morning came and there were eight cherries left. After some discussion, the boys were able to determine how many of the eight cherries each person should get so that each received a third of the original number. How many did each get?

ANSWER: TOM ___ DICK ___ HARRY ___

TODAY'S TWISTER

93. NAME _____

How many inches in the circumference of a circle whose area is 154 square inches?

Use $\pi = 22/7$

ANSWER _____

TODAY'S TWISTER

94. NAME _____

Compute:

a. $(2^3)^{(2^1)}$

b. $2^{(3^{(2^1)})}$

ANSWERS: a. _____ b. _____

TODAY'S TWISTER

95. NAME _____

Braithenwald deposited \$1 in January, \$2 in February, \$4 in March, \$8 in April, etc.

a. How much money will he have after his December deposit?

b. If he continues, what will be the amount of the 13th deposit in January of the second year?

c. How much money will he then have?

ANSWERS a. _____ b. _____ c. _____

TODAY'S TWISTER

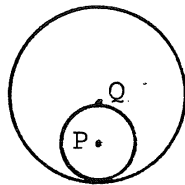
96. NAME _____

Two freight trains are traveling in opposite directions, one east at 45 miles per hour and the other west at 60 miles per hour. A man on the east-bound train is running west along the tops of the cars at the rate of 10 miles per hour and a man on the westbound train is running west at the rate of 15 miles per hour. At what rate do the two men pass each other when the trains pass?

ANSWER _____

TODAY'S TWISTER

97. NAME _____



Q is the center of the large circle and P is the center of the small circle. How far does point P travel while the small circle runs once around the inside of the large one if the circumference of the large circle is 22 inches?

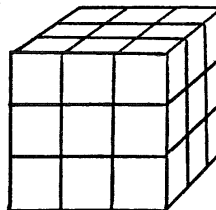
ANSWER _____

TODAY'S TWISTER

98. NAME _____

Here is a three inch cube which has been painted red. It is then cut into one inch cubes along the lines indicated. How many of the resulting one inch cubes have exactly:

- a. 6 painted surfaces ? _____
- b. 5 painted surfaces ? _____
- c. 4 painted surfaces ? _____
- d. 3 painted surfaces ? _____
- e. 2 painted surfaces ? _____
- f. 1 painted surface ? _____
- g. 0 painted surfaces ? _____



TODAY'S TWISTER

99. NAME _____

Which one of the following list of inequalities should be left out so that so that none of the remaining four will contain contradictions?

- a > b
- a > d
- b > c
- c > a
- d > c

ANSWER _____

TODAY'S TWISTER

100. NAME _____

Evaluate this continued fraction:

$$2 + \frac{2}{2 + \frac{2}{2 + \frac{2}{2 + \frac{2}{2 + \frac{2}{2 + 2}}}}}$$

ANSWER _____

TODAY'S TWISTER

101. NAME _____

$$\sqrt{25} = 5, \quad \sqrt{36} = 6, \quad \sqrt{100} = 10$$

$4! = 4 \times 3 \times 2 \times 1$, $9! = 9 \times 8 \times \dots \times 3 \times 2 \times 1$
(Remember factorials?)

Simplify:

$$\left(4 \times \sqrt{\frac{36}{100!}} \times 99! \times \frac{5}{3} \right) !$$

ANSWER _____

TODAY'S TWISTER

102. NAME _____

A fish is 6 inches long
plus two-thirds its length.
How long is it?

ANSWER _____

TODAY'S TWISTER

103. NAME _____

A field is owned by three people. A has three-fifths of it and B has twice as much as C. What fraction of the field belongs to C?

ANSWER _____

TODAY'S TWISTER

104. NAME _____

The Big Indian and the Little One

A big Indian and a little Indian were sitting on a fence. The little Indian was the big Indian's son but the big Indian was not the little Indian's father. How could this be?

ANSWER _____

TODAY'S TWISTER

105. NAME _____

Suppose the pond ponger reproduces by dividing in two every day. On the first day there is one, on the second day 2, the third day 4, etc. If, starting with one pond ponger, it takes 20 days to cover a certain area, how long will it take to cover the same area starting with two pongers?

ANSWER _____

TODAY'S TWISTER

106. NAME _____

As the number in the box gets larger and larger, what value does the complex fraction approach?

$$\frac{9 + \frac{2}{\square}}{3 - \frac{1}{\square}}$$

ANSWER _____

TODAY'S TWISTER

107. NAME _____

Let 8_4 mean $8+9+10+11$ (4 terms),
and 5_3 mean $5+6+7$ (3 terms).

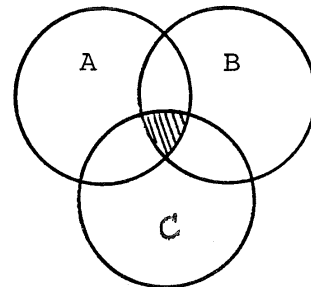
Evaluate:

$$21,408_5 - 21,406_5$$

ANSWER _____

TODAY'S TWISTER

108. NAME _____



Set A contains all the two digit whole numbers.

Set B contains all the primes.

Set C contains all whole numbers whose final digit is 1.

List the numbers which belong to the shaded area.

ANSWER _____

TODAY'S TWISTER

109. NAME _____

If four boys can wash four cars in six hours, how long will it take three boys to wash six cars?

ANSWER _____

TODAY'S TWISTER

110. NAME _____

If Mary weighs $112\frac{1}{2}$ lbs. and Ann weighs 100 lbs., for every 18 lbs. that Mary weighs, there are how many pounds in Ann's weight?

ANSWER _____

TODAY'S TWISTER

111. NAME _____

Sue wrote the sum of the numbers from 1 to 100 and underneath, wrote the sum backwards.

$$\begin{array}{r} 1 + 2 + \dots + 98 + 99 + 100 \\ \hline 100 + 99 + \dots + 3 + 2 + 1 \end{array}$$

From this she was able to find a short cut for adding up all the whole numbers from 1 to 100. See if you can do it.

ANSWER _____

TODAY'S TWISTER

112. NAME _____

Braithenwald spent $\frac{1}{3}$ of his money for candy, $\frac{1}{4}$ of his money for soda, and $\frac{1}{5}$ of his money for ice cream. If he then had 26¢ left, how much did he have at the start?

ANSWER _____

TODAY'S TWISTER

113. NAME _____

Boxes of cookies are arranged as shown below in a square pattern. Stacks of seven alternate with single boxes. A clerk in the store sold four boxes and then rearranged the stacking, keeping the square pattern and also keeping nine boxes on each side of the square. Show how he did it.

| | | |
|---|---|---|
| 1 | 7 | 1 |
| 7 | | 7 |
| 1 | 7 | 1 |

TODAY'S TWISTER

114. NAME _____

Subtract four thousand four-teen hundred and one-half from thirteen thousand thirteen hundred thirteen and one-half.

ANSWER _____

TODAY'S TWISTER

115. NAME _____

If a match and a half costs a penny and a half, how much will 11 matches cost?

ANSWER _____

TODAY'S TWISTER

116. NAME _____

If I add 1000 to a certain whole number, the result is more than if I had multiplied that number by 1000. What is the number?

ANSWER _____

TODAY'S TWISTER

117. NAME _____

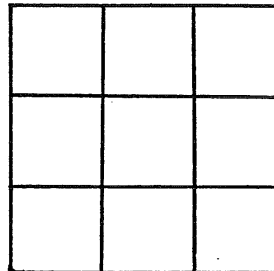
Name all the positive or negative whole numbers which, when multiplied by themselves, are equal to two more than themselves.

ANSWERS _____

TODAY'S TWISTER

118. NAME _____

Make a Magic Square by putting in the numbers 1 - 9 so that the sum of the horizontals, the verticals and the diagonals equals 15.

TODAY'S TWISTER

119. NAME _____

A boy bought a bat and a ball for \$1.25. If the bat cost 25¢ more than the ball, how much did each cost?

ANSWER _____

TODAY'S TWISTER

120. NAME _____

If it takes seven seconds for a clock to strike seven, how many seconds does it take to strike ten?

ANSWER _____

TODAY'S TWISTER

121. NAME _____

This one takes patience. There is a solution which involves only addition (no exponents, square root, subtraction, etc.).

Use eight 8's to make 1000.

ANSWER _____

TODAY'S TWISTER

122. NAME _____

Let $(8, 11)$ mean the interval of all numbers from 8 to 11 but including neither the 8 nor the 11. Some members are $8 \frac{1}{3}$, 9.3067, $10 \frac{1}{2}$, $10.\overline{89}$, etc.

How many multiples of 6 are members of the interval:

(200022, 200844) ?

Use some ingenuity; don't just count!

ANSWER _____

TODAY'S TWISTER

123. NAME _____

A farmer was asked whether he had a score of pigs. He said that he did not but if he had as many more, and half that many more, plus two pigs and a half, he would then have a score.

How many pigs did he have?

ANSWER _____

TODAY'S TWISTER

124. NAME _____

How many degrees are there between the hands of the clock at 4:40?

ANSWER _____

TODAY'S TWISTER

125. NAME _____

By how much does the sum of the reciprocals of $\frac{2}{5}$ and 2 exceed the reciprocal of their sum?

ANSWER _____

TODAY'S TWISTER

126. NAME _____

Without computing, name all the whole numbers less than eleven by which you know that

$$(2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 + 1)$$

is not divisible (evenly).

ANSWER _____

TODAY'S TWISTER

127. NAME _____

Suppose we know for certain that:

If Gretchen is grateful,
then Hortence is hopeful.

Then which, if any, of the following statements are true?

1. If Gretchen is not grateful,
Hortence is not hopeful.
2. If Hortence is hopeful,
Gretchen is grateful.
3. If Hortence is not hopeful,
Gretchen is not grateful.

ANSWER _____

TODAY'S TWISTER

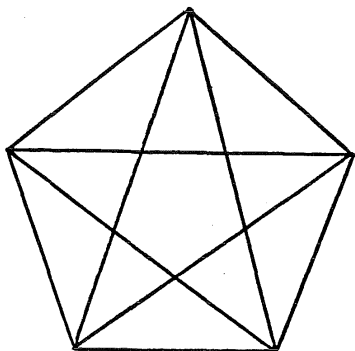
128. NAME _____

One window is one-half a yard square. Another window has an area of one-half square yard. The area of the first window is what fractional part of the second?

ANSWER _____

TODAY'S TWISTER

129. NAME _____

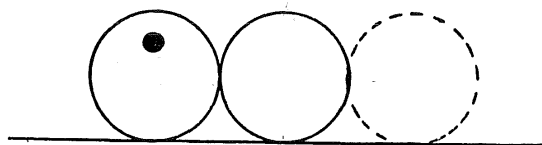


Count the triangles in this figure. Get all of them!

ANSWER _____

TODAY'S TWISTER

130. NAME _____



The left hand log has a knot on the end and near the top. That log is rolled over the log in the middle to the position at the right. Show the location of the knot in the right hand position.

TODAY'S TWISTER

131. NAME _____

$[5 \frac{2}{3}] = 5$, $[3.2] = 3$. That is, $[n]$ means to take only the greatest integer in n . Thus, $[2 \frac{1}{2}] = 2$, $[100] = 100$, $[0.3] = 0$.

Do these:

a. $[2 \frac{141}{151}] + [6 \frac{99}{110}]$

b. $[2 \frac{141}{151} + 6 \frac{99}{110}]$

c. $[2 \frac{50}{101} + 3 \frac{51}{100}]$ (Think, don't compute.)

ANSWERS: a. _____ b. _____ c. _____

TODAY'S TWISTER

132. NAME _____

There are three volumes of books, identical in size and shape, standing next to one another in order. A bookworm begins at the first page of Volume I and eats his way through to the last page of Volume III. If each book is $2 \frac{3}{4}$ inches thick with the pages representing $2 \frac{1}{2}$ inches of this, how far does the bookworm travel?

ANSWER _____

TODAY'S TWISTER

133. NAME _____

A man had \$1.15 in coins, all less than a dollar, in his pocket. Still, he could not make change for a dollar, a half dollar, a quarter, a dime or a nickel. What coins did he have in his pocket?

ANSWER _____

TODAY'S TWISTER

134. NAME _____

Mrs. "M" said,

"I have no sister and I have no brother, but that girl's mother is daughter to my mother."

Who is "that girl"?

ANSWER _____

TODAY'S TWISTER

135. NAME _____

Four 4's can be used to express numbers such as:

$$2 = 4/4 + 4/4, \quad 3 = \sqrt{4} + (4 \div 4) + 4$$

$$4 = \sqrt{4} + \sqrt{4} + 4 - 4$$

Use four 4's to express 11.

Any of the above symbols may be used as well as multiplication and decimal points.

ANSWER _____

TODAY'S TWISTER

136. NAME _____

List the letter of each number which is not the square of some integer:

a. 2501 b. 81 c. $\sqrt{81}$

d. 25.25 e. 90,000,000,000,000

f. 16,000,000 g. 30,147

h. $39 \times 3 \times 13$ i. 6^{15} j. -100

ANSWER _____

TODAY'S TWISTER

137. NAME _____

When Penelope broke her bank and counted all her pennies she found that when she counted them two at a time there was one left over. Also, when she counted them three, four, five or six at a time, there was always just one left over. What is the smallest number of pennies that Penelope could have had in her bank if, when she counted them seven at a time, there were none left over?

ANSWER _____

TODAY'S TWISTER

138. NAME _____

Show using a drawing how six toothpicks may be glued together to form four equilateral triangles which are congruent (same size and shape).

TODAY'S TWISTER

139. NAME _____

Recall that $[n]$ means the largest whole number in n : $[8.7] = 8$, $[5/8] = 0$ etc. What is the smallest whole number which can be put in both boxes so this sentence will not work?

$$\left[\frac{\square}{3} \right] = \left[\frac{\square}{4} \right]$$

TODAY'S TWISTER

140. NAME _____

How long would it take to cut a 387 inch length of string into 9 inch lengths if each cut takes two seconds?. Only one string is cut at a time.

ANSWER _____

TCDAY'S TWISTER

141. NAME _____

Two cyclists start at the same time from the same place and travel to a common finish point at the other side of a hill. Tom travels over the hill, averaging 3 miles per hour up for the first half and 11 miles per hour down for his second half. Sue goes around the hill at a constant 7 miles per hour. Which of these is correct if their total distances are equal?

- Tom beats Sue
- Sue beats Tom
- They tie
- Not enough information to tell

ANSWER _____

TODAY'S TWISTER

142. NAME _____

Name five numbers less than 20 which, when squared, give perfect cubes. Each number contains only one digit.

ANSWER _____

TODAY'S TWISTER

143. NAME _____

Which of the following is (are) evenly divisible by 2, 3, 6 and 9 (by all four numbers)?

| | | |
|-------|-------|-------|
| 156 | 236 | 5,364 |
| 4,010 | 1,010 | 207 |

ANSWER _____

TODAY'S TWISTER

144. NAME _____

True or false:

The statement "4/.03 is not greater than 3/.03" is not false.

ANSWER _____

TODAY'S TWISTER

145. NAME _____

Four boys have three pizzas to share. The pizzas have diameters of nine, twelve, and fifteen inches. Can you describe a way to divide the pizzas fairly using only 3 cuts?

ANSWER:

TODAY'S TWISTER

146. NAME _____

A girl went to a booth in an amusement park and said to the proprietor, "If you give me as much money as I now have then I will spend \$10.00 at your booth. It was done and repeated at a second and third booth. How much money did the girl have when she started at the first booth if she finished with no money left?"

ANSWER _____

147. TODAY'S TWISTER

NAME _____

Back when \$2 bills were in circulation a man bought a watch for \$103 including tax. Being rather an unusual person he paid for it in eight bills. How could this have been done if:

- a) He used any bills except \$2 bills
- b) He used any bills except \$1 bills

ANSWERS: a) _____
 b) _____

TODAY'S TWISTER

148. NAME _____

A conversation heard on a bus:

Man: "Was he related to you?"

Woman: "Yes. That gentleman's mother was my mother's mother-in-law, but he was not on speaking terms with my father."

Man: "Of course." But you could see that he was not a lot wiser.

How was the gentleman who was referred to by the woman related to the woman?

ANSWER _____

TODAY'S TWISTER

149. NAME _____

$$\sqrt{\square} = 2 \times \square$$

Name all the numbers which will make the above sentence true. (Same number in both boxes at once.)

ANSWER _____

TODAY'S TWISTER

150. NAME _____

Nicotine Nelly walked along the street picking up cigarette butts and used the tobacco in them to roll her own. If a standard size cigarette can be rolled out of six standard size butts, how many cigarettes can be rolled and smoked if Nellie finds 36 standard size butts?

ANSWER _____

TODAY'S TWISTER

151. NAME _____

Two trains start out at 7:00 A.M. One travels from Slobovia to Berlin and the other from Berlin to Slobovia. The first train makes the trip in 8 hours and the second in 12 hours. At what time of day will the two trains pass each other?

ANSWE _____

TODAY'S TWISTER

152. NAME _____

If a number appears in a triangle, it means to double the number and add 3.

Thus, $\triangle 4 = 11$

And suppose that $\circ n$ means to find the reciprocal of the number.

Find the value of:

a) $\triangle 4 + \circ 4 =$ _____

b) $\triangle \circ 3 \times \circ \triangle 3 =$ _____

TODAY'S TWISTER

153. NAME _____

A certain prime number between 100 and 200 is the same when written backwards but when written upside down and looked at in the mirror, is divisible by 7. What is it?

ANSWER _____

TODAY'S TWISTER

154. NAME _____

Mr. Tazzlewourtz hired a boy at a certain hourly wage, reduced his wage by ten percent, and later raised it by ten percent. The boy's new wage was then 2¢ less than the old. What was the new hourly wage?

ANSWER _____

TODAY'S TWISTER

155. NAME _____

Twice a fraction plus half that fraction times that fraction equals that fraction. What's the fraction?

ANSWER _____

TODAY'S TWISTER

156. NAME _____

A is less than B. If C is less than B then D is greater than E. What single definite conclusion can you come to regarding A if $D = 5$ and $E = 6$?

ANSWER _____

TODAY'S TWISTER

157. NAME _____

On a chessboard of 64 squares a man agreed to put a penny for his son on the first square the first day, 2¢ on the second square the second day, 4¢ on the third square the third day, then 8¢, 16¢, etc. How much money would he have given his son after 64 days?

- a. About \$100
- b. About \$60,000
- c. About 90 million dollars
- d. About 18 quintrillion dollars

ANSWER _____

TODAY'S TWISTER

158. NAME _____

There are less than six dozen eggs in a basket. If I count them two at a time, there is one left. If I count them three at a time there are two left. If I count them four at a time there are three left. And if I count them five at a time there are four left. How many eggs are there in the basket.

ANSWER _____

TODAY'S TWISTER

159. NAME _____

$$\frac{1}{2} + \frac{1}{5} + \frac{1}{7} = \frac{47}{70}$$

Find a set of fractions having different denominators but all having numerators of 1 so that the fractions add up to $\frac{17}{31}$.

Hint: $\frac{1}{2} = \frac{15\frac{1}{2}}{31}$

ANSWER _____

TODAY'S TWISTER

160. NAME _____

Between ten and twenty there are two consecutive integers which, when squared, have the same digits in different order. What are they?

ANSWER _____

TODAY'S TWISTER

161. NAME _____

Two mothers and two daughters left town. This resulted in a reduction in the population of three. How could this be?

ANSWER: _____

TODAY'S TWISTER

162. NAME _____

Halenthorpe rides his bike 5 miles to his grandmother's house at the rate of 10 miles per hour.

At what rate should he return home so that the average rate for the whole trip will be 12 miles per hour?

ANSWER _____

163. TODAY'S TWISTER

NAME _____

Compute in simplest form the reciprocal of the sum of the reciprocals of 0.5 and 3.

ANSWER _____

164. TODAY'S TWISTER

NAME _____

(Dirty trick problem)

Give the next three terms of this series:

O, T, T, F, __, __, __

TODAY'S TWISTER

165. NAME _____

If a question is not fair, say so.
If it is fair, give the answer.

Recall that $\lceil n \rceil$ means the largest
integer in n .

a. $\lceil (0.9)^{100} \rceil =$ _____

b. $\lceil 0.9 \rceil^{100} =$ _____

c. $\lceil (1.9)^{100} \rceil =$ _____

d. $\lceil 1.9 \rceil^{100} =$ _____

TODAY'S TWISTER

166. NAME _____

Evaluate:

$$\sqrt{\frac{\sqrt{4 \times 10^{16}}}{0.5}}$$

ANSWER _____

TODAY'S TWISTER

167. NAME _____

How many degrees are there
between the hands of the clock
at 12:01?

ANSWER _____

TODAY'S TWISTER

168. NAME _____

A can do a piece of work in
7 days. B is 50% more efficient
than A. How many days will it
take B to do the same piece of
work?

ANSWER _____

TODAY'S TWISTER

169. NAME _____

As the denominator of a fraction increases, the value of the fraction decreases:

1/2, 1/3, 1/4, etc.

What value does this complex fraction get closer and closer to as the number represented by y increases?

$$\frac{1}{1 - \frac{1}{y}}$$

ANSWER _____

TODAY'S TWISTER

170. NAME _____

What perfect square numbers having two digits give prime numbers when decreased by two?

Name all of them.

ANSWERS _____

TODAY'S TWISTER

171. NAME _____

Three quickies; get them all.

1. Four years ago the sum of the ages of two children was 11 years. What is their sum now? _____

2. Bill can wax a car in 3 hours and Tom can wax it in 6. Working together they can wax it in _____ hours.

(The answer is one of these:
2 hours, 4½ hours, 9hours.)

3. Atty Timwater had seventeen white mice and all but five died. How many did he have left? _____

TODAY'S TWISTER

172. NAME _____

Two math classes took the same test. One class of twenty students had an average grade of 80%. The other class of 30 students had an average grade of 70%. What was the average grade of all students in both classes?

ANSWER _____

TODAY'S TWISTER

173. NAME _____

A man was buying a certain item at the store. The clerk said:

"One costs ten cents. Seven will cost ten cents. Eleven will cost 20¢."

What was the man buying?

ANSWER _____

TODAY'S TWISTER

174. NAME _____

On the number line a (+6) tadhopper starts on 1 and jumps forward to 7, 13, 19, etc. Also, a (-4) tadhopper starts on 109, hops downward to 105, 101, 97, etc. Name all the numbers they both touch in common (not necessarily at the same time) between 45 and 89.

ANSWER _____

TODAY'S TWISTER

175. NAME _____

Today Billy is half as old as his mother. Twelve years ago, Billy was 1/3 as old as his mother was then. How old is each today?

ANSWERS:

Mother _____

Billy _____

TODAY'S TWISTER

176. NAME _____

AAAA
AAAB
AABA
AABB
ABAA
ABAB
ABBA
ABBB

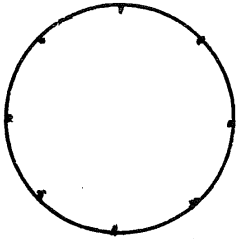
The column to the left contains patterns which may be used to discover the next two four lettered members. Try it.

____ ← ANSWERS

TODAY'S TWISTER

177. NAME _____

Six points are spaced equally around a circle. How many different straight lines can you draw so that each connects two of the points?



ANSWER _____

TODAY'S TWISTER

178. NAME _____

Give the letter of each expression which has a value of 1 - 10 inclusive.

- $\sqrt{1 \frac{1}{3}}$
- $9 \times .\overline{11}$ (repeating decimal)
- The sum of the three smallest factors of 1925
- $(10)^0$
- The sum of 35 terms of:
 $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \text{etc.}$
- $(0.9)^{50}$

ANSWERS _____

TODAY'S TWISTER

179. NAME _____

Find the two numbers whose product is 512 and whose quotient is 2.

ANSWER _____

TODAY'S TWISTER

180. NAME _____

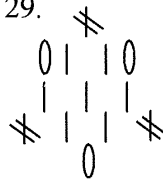
list the letter of each which always has an even number as an answer.

- The sum of three consecutive whole numbers
- The product of three consecutive whole numbers
- The sum of four consecutive whole numbers
- The sum of five consecutive whole numbers

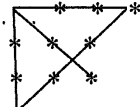
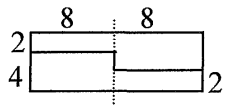

ANSWERS _____

Twister Answers 1 and Some Solution Comments.

- 7
 1. 314 or any of its 586 rotations 2. 24 3. 91 & 130 4. Move the right horizontals to the centers of the rectangles. This makes three overlapping rectangles.
5. Jack of spades, queen of spades, queen of hearts.
6. Fill 5, dump into 3, empty that 3. Dump the remaining 2 room the 5 into the 3. Fill the 5, dump into 3's space (1). 4 are now left in the 5! You can also start with 3 & get 5.
7. \$3 8a. $6 + 6/6$ b. $\sqrt{4} + \sqrt{4} + 4/4$. Other solutions possible. 9. 123455678900; curve ball question: ones should be added diagonally to stay in proper place value columns. 10987654321 is not correct.
10. 10 7/12 11. 28 12. 64 13. 30 14. -4 15. 21/110 16. Move the nine from the last group to the first. 17. 284. Divisors are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55 and 110.
18. Harry \$5, Cary \$7 19. White. This happens only with the North Pole as a starting point. Geometrically, it could also start 3+ miles from the South Pole but there are no bears there.
20. 80 cents. 21. Build it on the North Pole. 22. $4\frac{1}{2}$ and $1\frac{1}{2}$. 23. 345676543 (no perfect square can end in 3. 24. 38 days. 25a. 2 b. 29 c. 53 d. 97 26. Many possible answers. 27. O and R (not N and O) 28. 4 feet 29.
30. Double and add 1, double and subtract one, etc.
31. 124, 86, 11, 9, 3 (not 6), 5. 32. $a = 8, b = 9, c = 1$
33. Not genuine. The coin minter could not have know about "before Christ" before Christ.
34. 28 35. $9\frac{1}{2}$ (miles per day). 36. $19\frac{1}{5}$ sq. in. 37. 15 cents. 38. 156
39. * **** 40. 3 41. \$45 42. Base six 43. $13\frac{1}{5}$ seconds
 **** or * (1 1/5 seconds per interval)
 **** or *
 * ****
44. a 45. $7\frac{1}{2}$ 46. a. 23, 28, 33 b. 15, 21, 28
 c. 63, 127, 255 d. 55, 91, 140(Add squares 4,9,...)
47. $\square = 3, \hexagon = 7$ 48. 56 49. 6 (Note: This is the inverse idea of #34)
50. b. This would work for the moon or a basketball, and it could be verified for them.
51. 91 52. 14, 10 53. The letter "o" 54. 6 hrs. 55. 45 56. -2, 97, 8, 4, (Square and subtract 1.)
57. 20 miles. (It takes the cyclists one hour to meet)
58. a. Sally is sad b. No conclusion c. No conclusion d. Harry is not happy



Twister Answers 2 and Some Solution Comments.

59. 60 ft. (6 $\frac{2}{3}$ ft. per interval) 60. $12 + 3 + 4 + 56 + 7 + 8 + 9$
 61. $33 - 3 + 3/3$, $3^3 + 3 + 3/3$, others possible 62. 4 - 17's & 2 - 16's 63a. 6 b. 9
 64. d, f, h 65. 14 66. 13—It is easy to forget those busses enroute as he leaves plus those that depart while he is enroute.
 67. Neither – both distances equal.
 68. 22 ($\frac{1}{4}$ of the area of the large circle, since the small semicircles' radii are $\frac{1}{2}$ the larger.
 69. 20 hours. A $\frac{1}{4}$ increase gives a $\frac{5}{4}$ speed ratio. Time ratio is inverse, or 4:5, hence 20 hours.
 70. $3^3 + 3$ 71. 120 72. $\frac{4}{5}$ doz., 9.6 eggs 73. 4 hours 74. $\frac{1}{2}$ or 50-50. Even + odd remainder not in problem. 75. 26 76. $77 + 7/7$ (others?) 77. $\frac{5}{7}$
 78. All true, though many won't agree, (e) follows from (a-d). 79. $3 \frac{3}{4}$ days. One boy is equivalent to $\frac{2}{5}$ man so, "3 $\frac{1}{5}$ men" are working, needing $\frac{3}{(3 \frac{1}{5})}$ of 4 hours.
 80. 6 units 81. 3 82. 28 11 goose lays 1 egg in $1 \frac{1}{2}$ days; in 6 days (4 times as long), $4 \times 7 = 28$ eggs laid.
 83.  or a rotation of this
 84. $\frac{9}{58}$ 85. Exchange horses 86. No number; 2 results in division by 0.
 87. 31 days 88.  89. 
 90. 46 91a. 40,320 b. 9,506 92. Tom – 0, Rick – 3, Harry – 5 93. 44 (inches)
 94a. 64 b. 512 95a. \$4095 b. \$4096 c. \$8191 96. 110 mph 97. 11 in.
 98a. 0 b. 0 c. 0 d. .8 e. .12 f. .6 g. .1 99. $c > a$ 100. $2 \frac{19}{26}$ 101. 24
 102. 18 103. $\frac{2}{15}$ 104. The big Indian was his mother. 105. 19 days 106. 3
 107. 10 108. 11, 31, 41, 61, 71 109. 12 hours: 1 boy -1car in 6 hours, so 3 boys in 6 hours; 12 hours needed.
 110. 16 lbs. 111. 5,050 Add the rows; there are 100 101's, twice the sum (two rows);

$$\begin{array}{r} 252 \\ 55 \\ 252 \\ \hline 10100 \end{array} \quad 2 = 5050.$$

 112. \$1.20 113. $\begin{array}{r} 252 \\ 55 \\ 252 \end{array}$ 114. 9813. Note: four thousand fourteen hundred =

$$\begin{array}{r} 816 \\ 357 \\ 492 \end{array} \quad 4000+1400=5400.$$

 116. .1 or 0 117. -1, 2 118. 3 5 7 or one of its rotations. 119. 50cents & 75cents.
 120. $10 \frac{1}{2}$ seconds; $1 \frac{1}{6}$ sec. per interval between strikes, 9 intervals, 9 times $1 \frac{1}{6} = 10 \frac{1}{2}$
 121. $888+88+8+8+8$. (Other solutions?) 122. 136; $822/6=137$; 136 'separators'
 123. 7 124. 100 degrees ; the hour hand moved $\frac{2}{3}$ of the 30degrees between 4 & 5.

Twister Answers 3/3 and some solution comments.

125. $2\frac{7}{12}$ 126. 2 through 10. "The product" can share no factors with "the product plus 1" (no two consecutive numbers can have factors in common except the factor 1. 11 is the first possibility.
127. #3. #1 and #2 are often implicit in speech but do not follow logically.
128. $\frac{1}{2}$ ($2\frac{1}{4}$ sq. ft. to $4\frac{1}{2}$ sq. ft.) 129. 35. There are 7 kinds of triangles, 5 of each.
130. 131a. 8 b. 9 c. 6. Note the difficult reasoning needed in part c. $\frac{51}{100}$ exceeds $\frac{1}{2}$ by more than $\frac{50}{101}$ falls short of $\frac{1}{2}$.
132. 3" 133. Half dollar, a quarter, and 4 dimes. 134. Mrs. M's daughter.
135. $11 = 4/4 + 4/4$; others (?). 136. a, d, e, g, i, j. e has odd number of zeros. g ends in 7. i has odd number of 6's multiplied. (10000 is a square of an integer, 1000 is not.)
137. 301 138. A tetrahedron 139. 3 140. 84 seconds
141. b; there is a weighted average here. Tom spends more time at his slower rate.
142. -8, -1, 0, 1, 8. 143. 5364 (Use divisibility rules.)
144. False 145. The sum of the two smallest pie areas equals the largest so cut each in half. 1 big half = a medium half plus a small half. Note: this could be done with 1 cut if pies are stacked concentrically.
146. \$8.75 147. a. 50, 20, 20, 5, 5, 1, 1, 1 b. 50, 20, 20, 5, 2, 2, 2, 2.
148. Her uncle 149. 0 and $\frac{1}{4}$ 150. 7 – Don't forget the cigarette accumulated from the butts her smoking creates!
151. 11:48 A.M., a toughie. The time ratio is 2:3 (5 parts). The fast train goes $\frac{3}{5}$ of its total time while the slower train goes $\frac{2}{5}$ of its total time. Either way, $\frac{3}{5} \times 8 = \frac{2}{5} \times 12 = 4\frac{4}{5}$ hours (after 7 A.M.).
- 152a. $11\frac{1}{4}$ b. $\frac{29}{33}$ 153. 191 154. \$1.98 155. $\frac{2}{5}$ 156. $a < b$
157. d. 158. 59 159. $\frac{1}{2} + \frac{1}{31} + \frac{1}{62}$ 160. 13 and 14 161. Grandmother, mother and daughter.
162. 15 mph (Hard!) $10(\text{dist.})/12 = \frac{5}{6}$ hr. $\frac{1}{2}$ hour to go, so $\frac{1}{3}$ hr. to return. $5(\text{return distance}) / (\frac{1}{3}) = 15$
163. $\frac{3}{7}$ 164. F,S,S – first letters of Five, Six, Seven.
165. a. 0 b. 0 c. not fair d. 1 166. 20,000: common error: $\sqrt{10^{16}} = 10^4$
167. $5\frac{1}{2}$ degrees The minute hand goes 6 degrees of clock face arc and the hour hand goes $\frac{1}{12}$ as far, or $\frac{1}{2}$ degree. $6 - \frac{1}{2} = 5\frac{1}{2}$.
168. $4\frac{2}{3}$ days 50% more means $\frac{3}{2}$ times, taking $\frac{2}{3}$ of A's time. 169. 1
170. 25, 49, 81 171. 19, 2, 5 172. 74% 173. House numerals 174. 49, 61, 73, 85.
175. 48, 74 176. BAAA, BAAB 177. 15 178. a, b, d 179. 32, 16 180. b, c