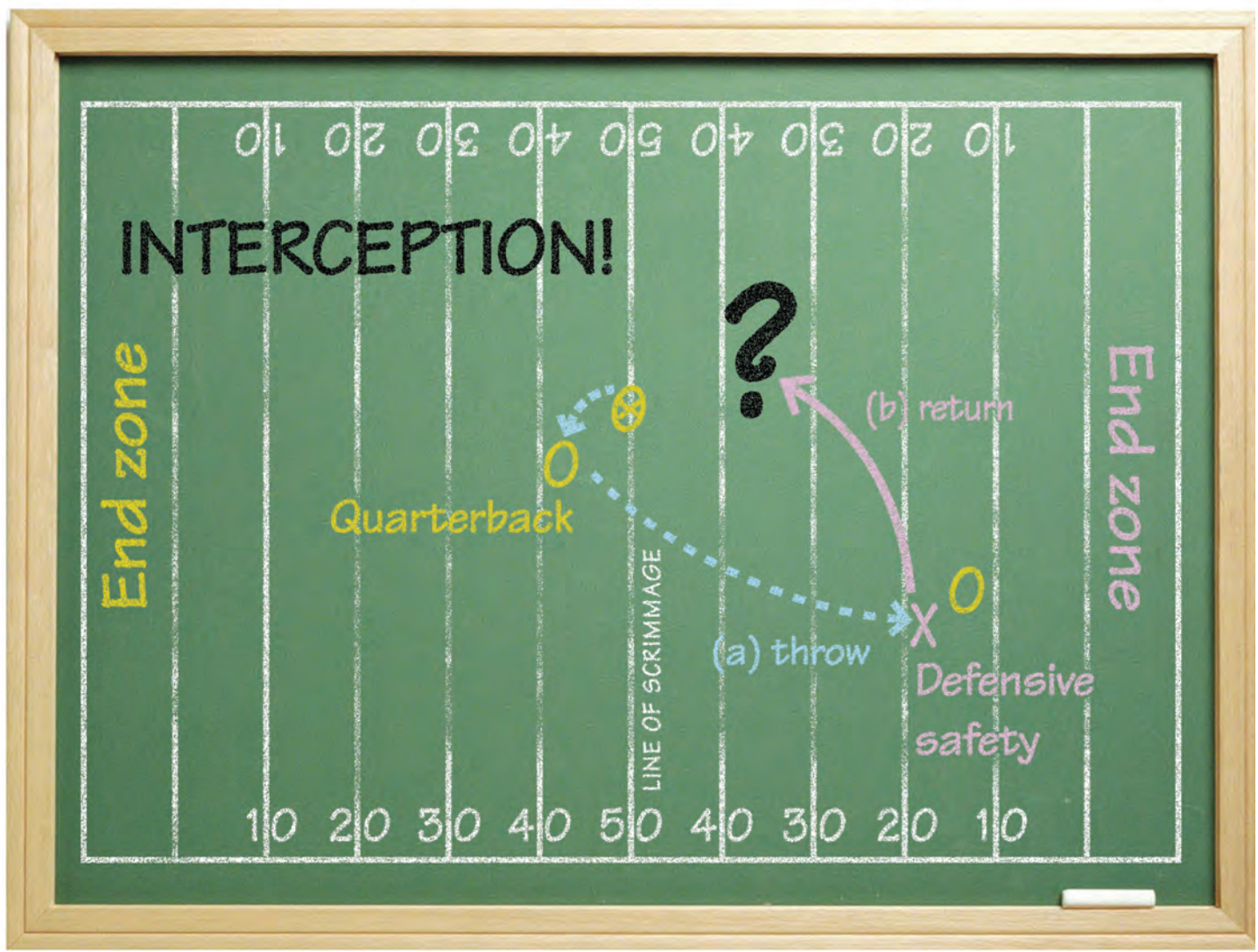


SUPER BOWL PLUS

When there's a break in the action, break out the pencils for math puzzlers

By Nancy Churnin/The Dallas Morning News



ROBERT WEST, ERIC GOODWIN/TNS

Hey, kids, not quite sure whether the Super Bowl refers to football or the big bowl of chips on the chair near the television set?

To get into the spirit of the game, try these football math problems from Paul Epner, the author of the Herbert Hilligan books, a series that mixes math with stories.

Not only will these problems help you brush up on your addition, fractions and multiplication — you'll soon know just what those touchdowns and field goals are worth. There are questions for every math level, starting with addition and multiplication and on through geometry. And you may find the Super Bowl more exciting while calculating the many-numbered possibilities on the way to victory!

1. UP, UP AND AWAY!

The kicker is getting ready to attempt a field goal and lines up six yards to the side of the ball and eight yards directly behind that. He runs in a straight line to the ball at an angle to the yard line. **How far does he run to kick the ball?**

Hint: The six yards and eight yards he lines up away from the ball can be considered the two legs of a right triangle. Think about right triangles and their hypotenuse.



2. WHO WON?

If team A makes four touchdowns, two field goals and two extra points, and if team B makes three touchdowns, three field goals, two extra points and a safety, **which team would win the game and by how much?**

Hint: A touchdown is 6 points, an extra point after a touchdown is 1 point, a field goal is 3 points, and a safety is 2 points.

3. INTERCEPTION!

The ball is on the 50-yard line when the quarterback throws it. He throws the ball 32 yards, but it is intercepted

by a defensive safety who runs it back 59 yards before getting tackled. **On what yard line is the ball now?**

Hint: Remember that the 50-yard line is the line of scrimmage. The field descends incrementally on each side.

4. HALFTIME MUNCHIES

Let's say three-fifths of the 65,000 people who attended the Super Bowl last year ate a hot dog.

A. If each hot dog weighed 8 ounces, then how many pounds of hot dogs were eaten at the Super Bowl? (Hint: 1 pound = 16 ounces.)

B. If each hot dog cost \$2.50, how much money was spent on hot dogs?

C. If the stadium's profit was 35 percent of all sales, how much profit was made on hot dog sales?

5. PASS COMPLETE!

Let's say the quarterback attempts 25 passes, and 20 of them are completed (caught) for a total of 200 yards.

A. What is the fraction of passes completed?

B. What percentage is completed?

C. What is the average number of yards per pass completed?

D. What is the average number of yards per pass attempted?

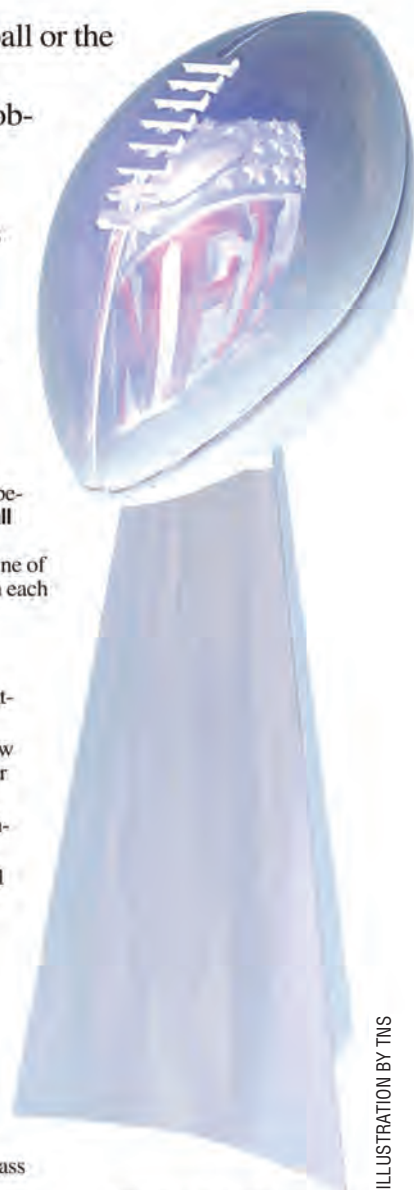


ILLUSTRATION BY TNS

The Lombardi Trophy is awarded to the winner of the Super Bowl.



"Herbert Hilligan and his Magical Lunchbox"

Meet the Math Guy, Paul Epner

Paul Epner, the Texas-based author and former math teacher who wrote the football math questions, is an old hand at mixing stories with math problems. He's written a series of books on the topic featuring a boy named Herbert Hilligan (Eakin Press, \$15.95 each).

In "Herbert Hilligan's Prehistoric Adventure," Herbert's lunchbox becomes a time traveling ship that takes

him back to the days of the dinosaurs. He finds himself on the beach in "Herbert Hilligan's Tropical Adventure"; takes a rather unusual route to school that includes running away from a crocodile in "Herbert Hilligan and His Magical Lunchbox"; and learns about Texas in "Herbert Hilligan's Lonestar Adventure."

The story and the questions at the bottom of each page rhyme. For example,

from "Prehistoric Adventure:"

"The brontosaurus he saw was the size of a whale; it was 75 feet from its head to its tail. If three dinosaurs stood straight up and tall, how many feet would that total in all?" The answer, 225, is in the back of the book.

Epner also has his own Web site: www.paulepner.com.

— Nancy Churnin

SCOREBOARD

The answers to our football puzzlers

1. UP, UP AND AWAY!

The kicker runs 10 yards. Why?

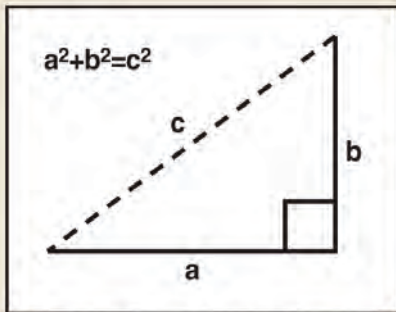
Look at the six and eight yards as the measurements for two legs of a right triangle. The length (or distance) you are looking for is the hypotenuse.

In geometry we use the Pythagorean theorem, a formula that says the square of one leg of a right triangle plus the square of the other leg of a right triangle equals the square of the hypotenuse of the right triangle. To square a number means to multiply it by itself.

The Pythagorean theorem says $a^2 + b^2 = c^2$.

Let $a = 6$ and $b = 8$. Six squared is $6 \times 6 = 36$. Eight squared is $8 \times 8 = 64$. $36 + 64 = 100$.

Since $100 = c^2$, c equals the square root of 100. The square root of 100 is the number that multiplied by itself equals 100. That number is 10, because $10 \times 10 = 100$.



The Pythagorean theorem

2. WHO WON?

Team A won by 1 point.

Team A made four touchdowns ($4 \times 6 = 24$ points), two field goals ($2 \times 3 = 6$ points) and two extra points ($2 \times 1 = 2$ points). $24 + 6 + 2 = 32$ points.

Team B made three touchdowns ($3 \times 6 = 18$ points), three field goals ($3 \times 3 = 9$ points), two extra points ($2 \times 1 = 2$ points) and a safety (2 points). $18 + 9 + 2 + 2 = 31$ points.

Team A had 32 points to Team B's 31. $32 - 31 = 1$. So Team A won by one point.

3. INTERCEPTION!

The ball is at the 23-yard line.

When the ball is thrown 32 yards from the 50-yard line, it is intercepted on the 18-yard line ($50 - 32 = 18$). When the ball is run back from the 18-yard line, the player runs 59 yards. After he runs 32 yards, he is back on the 50-yard line, but he must now travel 27 more for the total 59 yards. Twenty-seven yards from the 50-yard line is the 23-yard line. The opposing team is now 23 yards from a touchdown.

4. HALFTIME MUNCHIES

A. 19,500 pounds of hot dogs were eaten.

65,000 people times $\frac{3}{5} = 39,000$ people. Since 1 pound equals 16 ounces, and each hot dog weighs 8 ounces, then every two hot dogs equal 1 pound.



So if you divide 39,000 by two, you will find the number of pounds of hot dogs eaten. $39,000 \div 2 = 19,500$ pounds.

B. \$97,500 was spent on hot dogs.

39,000 hot dogs were eaten at a cost of \$2.50 per hot dog. $39,000 \times \$2.50 = \$97,500$.

C. \$34,125.

\$97,500 spent on hot dogs \times 35 percent (or .35) = \$34,125. The heartburn is free.

5. PASS COMPLETE!

A. $\frac{4}{5}$

Twenty completions divided by 25 attempts is $\frac{20}{25}$, which can be reduced to $\frac{4}{5}$. This means 4 of every 5 passes were completed.

B. 80 percent of the passes were completed.

Divide the numerator by the denominator. Four divided by 5 is $\frac{4}{5}$, or 0.8. Multiply the decimal by 100 or simply move the decimal two places to the right. Thus, the percentage is 80 percent.

C. The average is 10 yards per pass completed.

Divide the total number of yards (200) by the number of passes completed (20). $200 \div 20 = 10$ yards.



D. The average is eight yards per pass attempted.

Divide the total number of yards (200) by the number of passes attempted (25). That leaves an average of eight yards.