

How Long Are Size 18s?

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 A script for 4 players: A.J., René, Narrator and Teacher (Ms. Smiley)

A.J. AND RENÉ ARE TALKING.
 A.J.: Did you hear that Scooter Jones wears size 18 basketball shoes?
 René: No way! There's no such thing as size 18.
 A.J.: Yes there is! Bebock custom-made a special pair for him. He wears them when he plays for the Croakers so he can hype the shoes in TV ads.
 René: What kind of Bebocks does Scooter wear?
 A.J.: You mean you don't know? You're really out of it! Don't you watch TV? He wears *Magic Pumpers*. The laces are filled with liquid quartz so his shoes don't squeak when he makes turns. You probably don't know about the contest either.
 René: What contest?
 A.J.: The *How Long Is Scooter's Shoe* contest. You have to guess the length of Scooter's left shoe.
 René: What's the prize?
 A.J.: Two front row tickets to the playoffs, if the Croakers make it.
 René: What are the contest rules?
 A.J.: One entry per person. Give the length to the nearest tenth of a centimeter. In case of a tie a winner will be drawn from those who give the correct answer.
 René: Let's try for it.
 NARRATOR: René goes down to the BIG 6 sporting goods store and takes some measurements on different sizes of *Magic Pumpers*. René writes these numbers on a scrap of paper:

$7\frac{1}{2}$ - 27.2	8 - 27.4	$8\frac{1}{2}$ - 28.1	9 - 28.6
$9\frac{1}{2}$ - 28.2	10 - 29.3	11 - 30.0	12 - 31.1

* These are actual measurements taken from one brand of basketball shoes. Write these measurements on the overhead or slide board.

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- **MATERIALS:** Calculators, scripts for volunteer readers (3), (p. 53), transparencies from script (p. 53).
- **TIME:** 1 hour

Too often students wait for their teacher or somebody else to tell them which strategy is appropriate in any given mathematical problem or situation. Students need to build a personal mathematical tool kit which allows them to choose and use mathematical instruments and strategies as tools to solve problems as independently as possible. In the Investigations Units much of the work students will be doing involves finding out about the relationships between two sets of numbers and using the relationship to make predictions.

In *How Long Are Size 18s?*, A. J. and René want to find the relationship between standard shoe sizes and the lengths of shoes. They use the following mathematical tools:

- sketch a diagram;
- make a table;
- draw a graph;
- use a formula.

The short skit *How Long Are Size 18s?* reviews these tools and presents students choosing and using them as needed.

Select three students for the parts of A. J., René and the narrator. Have them read the script aloud to the class up to the assignment section of the script. Stop and let students work on predicting the length of Scooter's size 18s. Their work can serve as a pre-assessment for the unit.

After students share their predictions and methods, have the students continue the script. Be prepared to use transparencies or the chalkboard to supplement the script.

Resist the temptation to give out formulas — chances are the kids won't remember them anyway. If you wait and let your students figure them out on their own, they'll be much more useful.

— Middle school teacher

* **Note 1:** Using linear regression to find the line of best fit for René's data gives an equation of $y = 0.8574x + 20.72$ where x is shoe size and y is the length of the shoe in cm. The correlation coefficient for these data is 0.996. Paired data with perfect linear correlation have a correlation coefficient of 1. Substituting 18 into the equation for x gives

a value of 36.15 cm.
Note 2: Shoe sizes in the U.S. are based on the inch. As decreed in 1324 by King Edward II of England, the inch equals a length of three barleycorns. Shoemakers of that day decided that the longest normal men's foot was about the length of 39 barleycorns or 13 inches. Therefore the largest standard

size made was size 13, with smaller full sizes reduced by one barleycorn each. So size 12 was 38 barleycorns, size 11 was 37 barleycorns, etc. Since each barleycorn is a third-of-an-inch, half-sizes fall a sixth-of-an-inch shorter or longer than the full sizes they lie between. For women and children's shoes, a different sizing system is used. Although

the U.S. still uses this system of shoe sizing, England and the rest of the world now use a metric shoe-sizing system. More information about shoe sizing, and other weird measurements, can be found in *Reading the Numbers: A Survival Guide to the Measurements, Numbers, and Sizes Encountered in Everyday Life* by Mary Blocksma.