Sneakers

You are an owner of a sports outlet store. The table shows data about your sneaker sales in a recent week.

Type of Sneaker	Pairs Sold
Adidas®	124
Nike®	64
Tiger®	49
Saucony®	42
Converse® High Tops	21

Next week, you plan to order 36 dozen sneakers. Explain how you can use the data to decide how many dozen of each type to order.

Grade Levels 6 - 8

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Context

This sixth grade class did some informal and more formal work with percents. It was their first formal academic exposure to percents. We also had worked with fractions, with a very limited introduction to ratios. I realize how important the concept of proportionality is and want to expose my students to many types of problems that deal with data.

What This Task Accomplishes

I wanted this task to assess which students recognized the fact that percents or ratios could help in solving this problem. I would also be able to see which students did not have a working knowledge of proportionality. The data is messy (the number of pairs of sneakers sold last year does not divide to dozens of sneakers evenly). Students have to make decisions about estimating the distribution of pairs of sneakers.

What the Student Will Do

Most students started by changing 36 dozen sneakers to 432 pairs of sneakers. Other students renamed the pairs of sneaker sold last week to dozens. From that point on the strategies varied. Some students recognized that percents could help solve the problem, others used a formal concept of proportions, and others had a more intuitive feeling for proportions. Still others ignored the data and distributed the 36 dozen sneakers evenly.

Time Required for Task

50 minutes

Some students needed more time to write up their reasoning and organize their response.

Interdisciplinary Links

Students can get a sense of what stores must think about as they try to meet their customers' needs and make a reasonable profit.

Teaching Tips

Have calculators available for the computation. It is always interesting to see how students interpret decimal remainders when using calculators.

Suggested Materials

Calculators

Possible Solutions

Answers may vary according to the reasoning and estimating used by each student. Solutions should be close to the findings below:

Adidas® sold 124 out of 300 or about 41% of the sneakers last week. You may want to order 41% of the 36 dozen (or 432 pairs) which is about 14.8 or 15 dozen.

Nike® sold 64 out of 300 or about 21% of the sneakers last week. You may want to order 21% of the 36 dozen which is about eight dozen.

Tiger® sold 49 out of 300 or about 16% of the sneakers last week. You may want to order 16% of the 36 dozen which is about six dozen.

Saucony® sold 42 out of 300 or about 14% of the sneakers last week. You may want to order 14% of the 36 dozen which is about five dozen.

(This leaves only two dozen for Converse® High Tops.)

Converse® High Tops sold 21 out of 300 or about 7% of the sneakers last week.

You may want to order 7% of the 36 dozen which is about 2.52 or two dozen.

Benchmark Descriptors

Novice

The solution has no relationship to the task. It looks like the student divided Adidas® pairs of sneakers in half, but even that strategy is not consistent with the rest of the brands. There is

only a limited explanation, but enough to show the student did not understand how to approach the problem.

Apprentice

Although this student has a reasonable solution, there is no evidence of how those numbers came about. What was the child's strategy or reasoning? If they added "a little more to each" then why were about five dozen added to Adidas® and only four pairs of sneakers added to Converse®? There are too many questions about this child's strategy and reasoning. I would want a conference with this student to see if they could better explain their solution.

Practitioner

Although this student is not very confident about his/her approach (his/her last line said s/he thought that most of her work was just guessing), for the most part, it is a mathematically sound strategy. S/he is trying to keep the sneaker sales proportional. S/he adds to the chart that is already there for the representation and has a clear explanation.

Expert

The solution shows a deep understanding of the problem. The student connected the idea of percents to keep the proportionality of the sneakers sold. This strategy leads directly to a solution. S/he also verified his/her results and realized that strictly rounding would cause his/her total to be too big and made a decision to lower one estimate. There is a clear and effective explanation detailing how the problem is solved. There is precise and appropriate mathematical terminology and notation.

Novice

The student uses the word "proportional", but it is unclear if the student understands the term.

Type of Sneaker	Number Sold	
Adidas	124 =	11+5 16 11
Nike	64 =	6+2=8 6
Tiger	49 =	5+0=5 X
Saucony	42 =	4+1 =5 D
Converse High Tops	21 -	210=2 27
		~ /

I used the procortional property to divide up the 36 dozen according to the humba of pairs soll the Week before 212=4.083.... 42:12=3.5 21:2=4.083.... 21:2=4.083.... 21:2=4.083.... 21:2=4.083....

It is unclear why the student divides by 12.

First I divided all the humbers by 12 and 39 of for Adidios II dozen, Nike 6, tigers, saucony4, converse 2. Ilooked at the data and decided that Adid as should get the most sense 124 pairs of shoes were sold, 60 more than Nike. So Igave them to dozen, 4 of the 36 dozen (4 x 36 dozen) Next was Nike t around 6 dozen of them were sold last week so I gave them 2 extra dozen=8 doz = ? x 36 dozen. Then came Tiger who cold 49 pairs. 45: 12:90: I rounded this up to 5. I added I dozen for this arder incase clemand increases. Saucony had 42: 12:33, round up to 4 add nore. (onverse / tigh Tops had 21: 12: 1.75 round up to 2. Add 16+8+6+4+2=36.

The solution lacks mathematical reasoning.

Apprentice

This work lacks an explanation of reasoning and decision making as well as an approach.

Type of Sneaker	Number Sold	L
Adidas	124	
Nike	64	
Tiger	49	
Saucony	42	2
Converse High Tops	21	

The student does demonstrate some number sense.

The student does demonstrate some understanding of the problem.



I added a little more to each Becouse Somone mite wont some and to have some in Stock

Practitioner

The student displays his/her solution.

Type of Sneaker	Number Sold		
			dozen
Adidas	1921	.24	16
Nike	96	64	8
Tiger	72	49	6
Saucony	42	42	ÿ
Converse High Tops	24	21	2
	432	300	3/.

solution by keeping the The student explains his/her reasoning. proportions similar. guessed that Adidas would have more and then Nike, Tiger, saucony, converse High Tops. I guessed that it would be 16 for Adidas and then I new that Nike was half of Adidas $50 \pm did$ Nike 8 and $\pm know$ that Tiger was more then to of Nike so I did liger and I knew saviony was a little less t Tiger so I did Saviony 4 and converse less then was a less then saucony so I did Converse 2. Most my work was qguessing

The student obtains a correct

Expert

Work is well labeled.	The student explains his/her approach and reasoning.	Notes 36×12=432 pairs
Type of Sneaker	Number Sold	L [] × 12 = 13 2 pairs
Adidas	.41= 124	+ 41 % >>1 %
Nike	·21+ 64	*11.01 ×36
Tiger	-16 = 49	10 10 3/49
Saucony	./4 = 42	- 79.
Converse High Tops	•07 21	
	Total 36 300	
Duil	grade this	-

I found the percents by dividing the smaller numbers by the larger numbers. e.g. 64: 300: 0.2133333 then I took the first two digits (which are ZI) and then I just got the Percentages (21%). Then you just take the two first digits and you now have the decimal numbers (.21)

Then I multiplyed . 21 X36 and I got vny answer of 7.56 which roonded op would be Bdozen.

* opps ... I rounded up to many times. I'll make tiger 5 like Saucony.

The student evaluates the reasonableness of an aspect of his/her reasoning.

Expert

The case of the 36 dozen Snelly: Shoes Final draft Student displays under of the algorithms used. Student displays understanding of the algorithms used.

In order to solve this problem, I had to first find the percentages. I found out the decimal numbers first and then converted the decimal numbers into precentages. I took my calculater and punched these numbers: 64 divided by 300 and I got 0.2133333. Then I took the first two digits which in this case are 2 and 1 and I kept the decimal point were it is and so now the decemal number is . 21. Iknow, Iknow @ you want to know what the percentage is. The way I found out the percentage, was. I looked at the first two digits and added a percent sign (but dropped the decimal point 21% and so now I have the precentage. There are you I happy now? Now comes the tricky part, so watch closely." In order to find out how many obser of each kind of shoe you get you have to moltiply .21(the decimal number) by 36. You have to multiply it by 36 because you have 36 dozen shoes. Now take your calculator and punch in ZIX36 and it should equal 7.56 (unless you have a messed calculator). Now I sure hope you know how to round, because in this case you round it up to & So you have & dozen Nikes to order. Boy I sure hope you have 8 dozen feetor %.

Well please give yourself a pat on the back for helping solve this ase. By the way, you didn't nappan to PUNCH your calculater did you? Because when

Expert

I said punch F ment press the buttons on your calculater, not punch them!! Well if you did you pobly broke it, so you better go to the store and get a new one fast because Ms. Forseth gives lots of hard criteria problems.

Bye. Personally I think I was a pretty good teacher. Maybe I'll be a teacher instead of working with volves. Nah!

Jood Luck

Answer st Andidas = 15 dozen Nike = 8 dozen Tiger = 6 dozen (H.T.= 3 dozen Saucony: 5 dozen