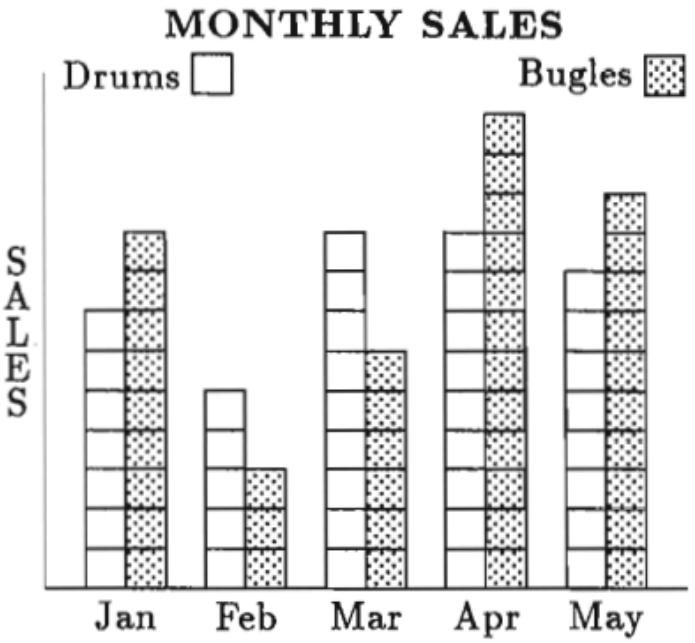
1992 Q21

21. Northside's Drum and Bugle Corps raised money for a trip. The drummers and bugle players kept separate sales records. According to the double bar graph, in what month did one group's sales exceed the other's by the greatest percent?

(A) Jan (B) Feb
(C) Mar (D) Apr
(E) May



21. (B) Compute the ratios for each month:

Month	Drums	Bugles	Diff.	Diff.:Lower	% exc.
Jan :	7	9	2	2:7	29%
Feb :	5	3	2	2:3	67%
Mar :	9	6	3	3:6	50%
Apr :	9	12	3	3:9	33%
May :	8	10	2	2:8	25%

Thus the percent is greatest in February.

Note. Students can estimate the required ratio by visually comparing the difference between the columns to the shorter column.

1993 Q21

21. If the length of a rectangle is increased by 20% and its width is increased by 50%, then the area is increased by

(A) 10% (B) 30% (C) 70% (D) 80% (E) 100%

21. **(D)** When a problem indicates a general result, then it must hold for any specific case. Therefore, suppose the original rectangle is 10 by 10 with area 100. The new length is $10 + 2 = 12$ and the new width is $10 + 5 = 15$. Hence the new area is $12 \times 15 = 180$ for an increase of 80%.

OR

The length is changed to 120%, or 1.2 times its original value, and the width is changed to 150%, or 1.5 times its original value. Since area is length times width, the new area is $1.2 \times 1.5 = 1.8$ times the original area. Thus the area is increased by 80%.

2005 Q22

22. A company sells detergent in three different sized boxes: small (S), medium (M) and large (L). The medium size costs 50% more than the small size and contains 20% less detergent than the large size. The large size contains twice as much detergent as the small size and costs 30% more than the medium size. Rank the three sizes from best to worst buy.

(A) SML (B) LMS (C) MSL (D) LSM (E) MLS

22. **(E)** Neither the units of size nor the cost are important in this problem. So for convenience, suppose the small size costs \$1 and weighs 10 ounces. To determine the relative value, we compare the cost per unit weight.

$$\text{S}: \frac{\$1.00}{10} = 10\,¢ \text{ per oz.}$$
$$\text{M}: \frac{\$1.50}{0.8 \times 20} = 9.375\,¢ \text{ per oz.}$$
$$\text{L}: \frac{1.3 \times \$1.50}{20} = 9.75\,¢ \text{ per oz.}$$

So the value, or buy, from best to worst is medium, large and small, that is MLS.

4 / 8

2004 Q22

22. At a party there are only single women and married men with their wives. The probability that a randomly selected woman is single is $\frac{2}{5}$. What fraction of the people in the room are married men?

(A) $\frac{1}{3}$ **(B)** $\frac{3}{8}$ **(C)** $\frac{2}{5}$ **(D)** $\frac{5}{12}$ **(E)** $\frac{3}{5}$

22. **(B)** Because $\frac{2}{5}$ of all the women in the room are single, there are two single women for every three married women in the room. There are also two single women for every three married men in the room. So out of every $2+3+3=8$ people, 3 are men. The fraction of the people who are married men is $\frac{3}{8}$.

5 / 8

1985 Q21

21. Mr. Green receives a 10% raise every year. His salary after four such raises has gone up by what percent?

A) less than 40% B) 40% C) 44% D) 45% E) More than 45%

21. (E) If the initial salary is thought of as \$100 then the first 10% increase gives \$110. The second 10% increase gives \$110 + \$11 = \$121. The third increase gives \$121 + \$12.10 = \$133.10 and the fourth increase gives \$133.10 + \$13.31 = \$146.41 for an increase of 46.41%

OR

If S is the initial salary then the salary after four 10% increases is $(1.1)(1.1)(1.1)(1.1)S = 1.4641S$ for an increase of 46.41%.

1987 Q23

23. Assume the adjoining chart shows the 1980 U.S. population, in millions, for each region by ethnic group. To the nearest percent, what percent of the U.S. Black population lived in the South?

	NE	MW	South	West
White	42	52	57	35
Black	5	5	15	2
Asian	1	1	1	3
Other	1	1	2	4

A) 20% B) 25% C) 40% D) 56% E) 80%

23. D The total Black population is the sum of the Black populations in each of the four regions or

5 + 5 + 15 + 2 = 27 million. Thus

$\frac{15}{27} = \frac{5}{9} \approx 55.56\%$ lived in the South.

(The population figures were taken from the World Almanac and adjusted slightly for convenience.)

1988 Q22

22. Tom's Hat Shoppe increased all original prices by 25%. Now the shoppe is having a sale where all prices are 20% off these increased prices. Which statement best describes the sale price of an item ?

A) The sale price is 5% higher than the original price.

B) The sale price is higher than the original price, but by less than 5%.

C) The sale price is higher than the original price, but by more than 5%.

D) The sale price is lower than the original price.

E) The sale price is the same as the original price.

22. E An item whose original cost was \$100, for example, will cost \$25 more or \$125. The sale price of a \$125 item will be 80% of its current price or .8(\$125) = \$100 - - the original cost. The same kind of comparison can be made for any original cost.

8 / 8

2002 Q24

24. Miki has a dozen oranges of the same size and a dozen pears of the same size. Miki uses her juicer to extract 8 ounces of pear juice from 3 pears and 8 ounces of orange juice from 2 oranges. She makes a pear-orange juice blend from an equal number of pears and oranges. What percent of the blend is pear juice?

(A) 30 **(B)** 40 **(C)** 50 **(D)** 60 **(E)** 70

24. **(B)** Use 6 pears to make 16 oz of pear juice and 6 oranges to make 24 oz of orange juice for a total of 40 oz of juice. The percent of pear juice is $\frac{16}{40} = \frac{4}{10} = 40\%$.

OR

Miki can make 8 oz of orange juice with 2 oranges, so she can make 4 oz of orange juice with 1 orange. She can make 8 oz of pear juice from 3 pears, so she can make $\frac{8}{3}$ oz of pear juice from 1 pear. With 1 orange and 1 pear, she can make $4 + \frac{8}{3} = \frac{20}{3}$ oz of the blend, of which $\frac{8}{3}$ oz is pear juice. As a percent, $\frac{\frac{8}{3}}{\frac{20}{3}} = \frac{8}{20} = \frac{4}{10} = 40\%$ of the blend is pear juice.