

1993 AJHSME Problems

Problem 1

Which pair of numbers does NOT have a product equal to 36?

- (A) $\{-4, -9\}$ (B) $\{-3, -12\}$ (C) $\left\{\frac{1}{2}, -72\right\}$ (D) $\{1, 36\}$ (E) $\left\{\frac{3}{2}, 24\right\}$

Problem 2

When the fraction $\frac{49}{84}$ is expressed in simplest form, then the sum of the numerator and the denominator will be

- (A) 11 (B) 17 (C) 19 (D) 33 (E) 133

Problem 3

Which of the following numbers has the largest prime factor?

- (A) 39 (B) 51 (C) 77 (D) 91 (E) 121

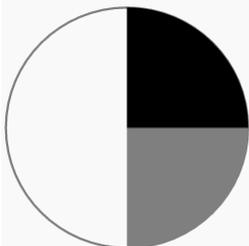
Problem 4

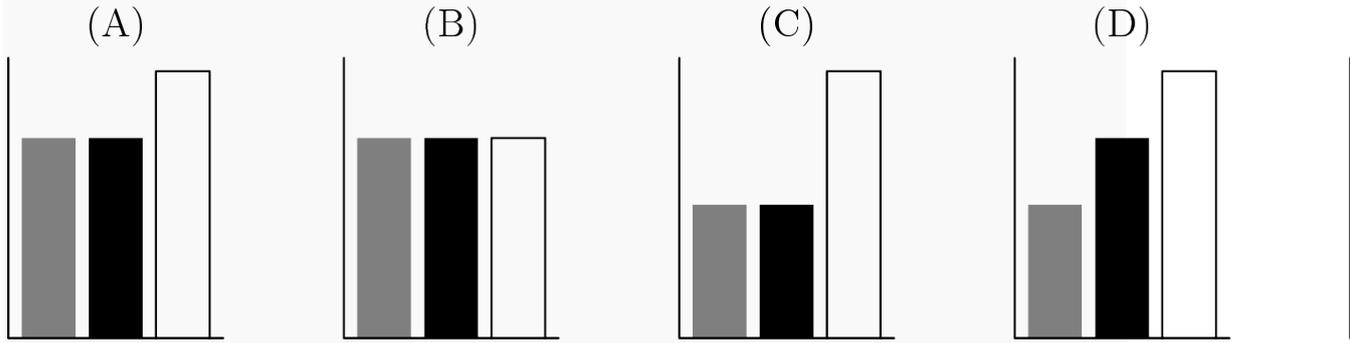
$1000 \times 1993 \times 0.1993 \times 10 =$

- (A) 1.993×10^3 (B) 1993.1993 (C) $(199.3)^2$ (D) 1,993,001.993 (E) $(1993)^2$

Problem 5

Which one of the following bar graphs could represent the data from the circle graph?





Problem 6

A can of soup can feed 3 adults or 5 children. If there are 5 cans of soup and 15 children are fed, then how many adults would the remaining soup feed?

- (A) 5 (B) 6 (C) 7 (D) 8 (E) 25

Problem 7

$$3^3 + 3^3 + 3^3 =$$

- (A) 3^4 (B) 9^3 (C) 3^9 (D) 27^3 (E) 3^{27}

Problem 8

To control her blood pressure, Jill's grandmother takes one half of a pill every other day. If one supply of medicine contains 60 pills, then the supply of medicine would last approximately

- (A) 1 month (B) 4 months (C) 6 months (D) 8 months (E) 1 year

Problem 9

Consider the operation $*$ defined by the following table:

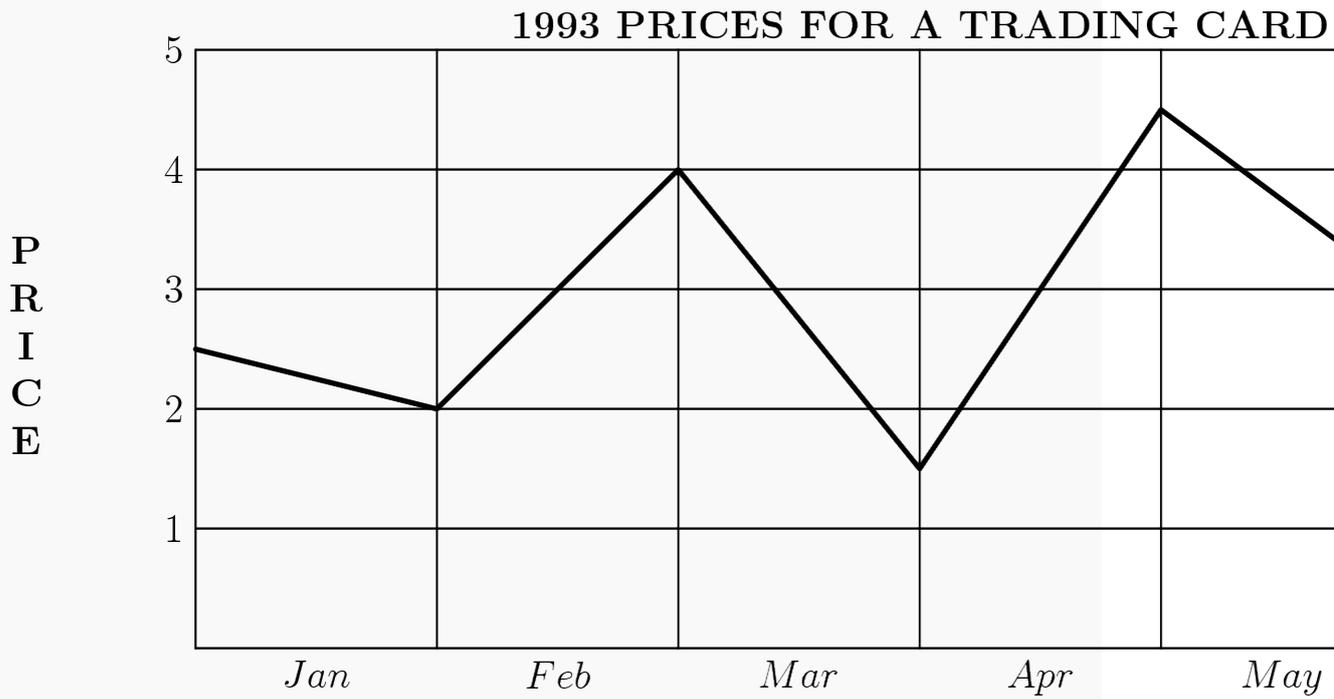
$*$	1	2	3	4
1	1	2	3	4
2	2	4	1	3
3	3	1	4	2
4	4	3	2	1

For example, $3 * 2 = 1$. Then $(2 * 4) * (1 * 3) =$

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Problem 10

This line graph represents the price of a trading card during the first 6 months of 1993.



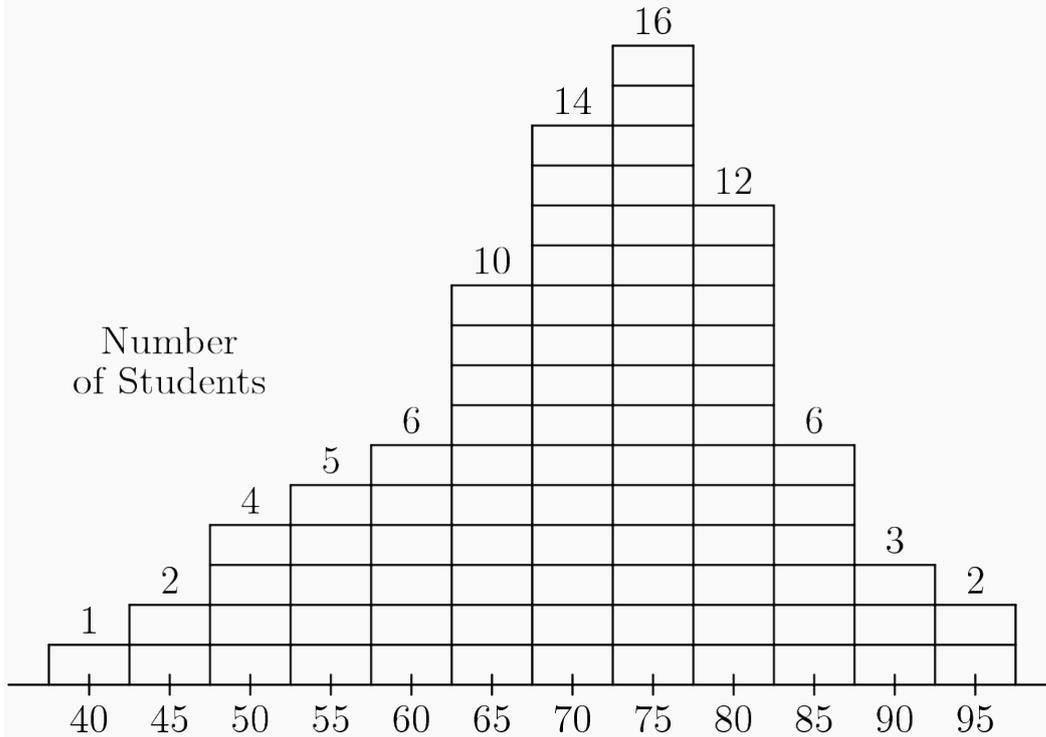
The greatest monthly drop in price occurred during

- (A) January (B) March (C) April (D) May (E) June

Problem 11

Consider this histogram of the scores for 81 students taking a test:

STUDENT TEST SCORES



The median is in the interval labeled

- (A) 60 (B) 65 (C) 70 (D) 75 (E) 80

Problem 12

If each of the three operation signs, $+$, $-$, \times , is used exactly ONCE in one of the blanks in the expression

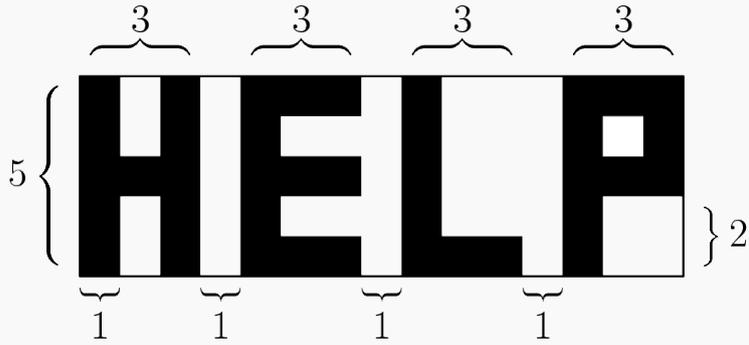
$$5 _ 4 _ 6 _ 3$$

then the value of the result could equal

- (A) 9 (B) 10 (C) 15 (D) 16 (E) 19

Problem 13

The word "HELP" in block letters is painted in black with strokes 1 unit wide on a 5 by 15 rectangular white sign with dimensions as shown. The area of the white portion of the sign, in square units, is



- (A) 30 (B) 32 (C) 34 (D) 36 (E) 38

Problem 14

The nine squares in the table shown are to be filled so that every row and every column contains each of the numbers 1, 2, 3. Then $A + B =$

1		
	2	A
		B

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

Problem 15

The arithmetic mean (average) of four numbers is 85. If the largest of these numbers is 97, then the mean of the remaining three numbers is

- (A) 81.0 (B) 82.7 (C) 83.0 (D) 84.0 (E) 84.3

Problem 16

$$\frac{1}{1 + \frac{1}{2 + \frac{1}{3}}} =$$

- (A) $\frac{1}{6}$ (B) $\frac{3}{10}$ (C) $\frac{7}{10}$ (D) $\frac{5}{6}$ (E) $\frac{10}{3}$

Problem 17

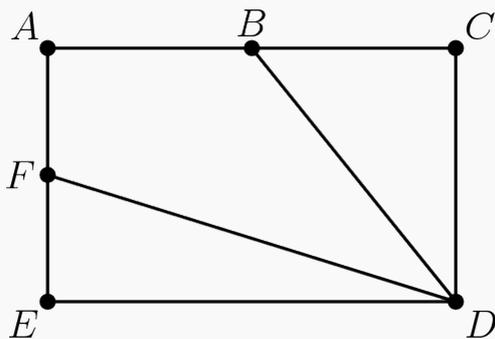
Square corners, 5 units on a side, are removed from a 20 unit by 30 unit rectangular sheet of cardboard. The sides are then folded to form an open box. The surface area, in square units, of the interior of the box is



- (A) 300 (B) 500 (C) 550 (D) 600 (E) 1000

Problem 18

The rectangle shown has length $AC = 32$, width $AE = 20$, and B and F are midpoints of \overline{AC} and \overline{AE} , respectively. The area of quadrilateral $ABDF$ is



- (A) 320 (B) 325 (C) 330 (D) 335 (E) 340

Problem 19

$$(1901 + 1902 + 1903 + \cdots + 1993) - (101 + 102 + 103 + \cdots + 193) =$$

- (A) 167,400 (B) 172,050 (C) 181,071 (D) 199,300 (E) 362,142

Problem 20

When $10^{93} - 93$ is expressed as a single whole number, the sum of the digits is

- (A) 10 (B) 93 (C) 819 (D) 826 (E) 833

Problem 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%

Problem 22

Pat Peano has plenty of 0's, 1's, 3's, 4's, 5's, 6's, 7's, 8's and 9's, but he has only twenty-two 2's. How far can he number the pages of his scrapbook with these digits?

- (A) 22 (B) 99 (C) 112 (D) 119 (E) 199

Problem 23

Five runners, P , Q , R , S , T , have a race, and P beats Q , P beats R , Q beats S , and T finishes after P and before Q . Who could NOT have finished third in the race?

- (A) P and Q (B) P and R (C) P and S (D) P and T (E) P , S and T

Problem 24

What number is directly above 142 in this array of numbers?

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      1
     2  3  4
    5  6  7  8  9
10 11 12 ...
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- (A) 99 (B) 119 (C) 120 (D) 121 (E) 122

Problem 25

A checkerboard consists of one-inch squares. A square card, 1.5 inches on a side, is placed on the board so that it covers part or all of the area of each of n squares. The maximum possible value of n is

- (A) 4 or 5 (B) 6 or 7 (C) 8 or 9 (D) 10 or 11 (E) 12 or more

