# 1992 AJHSME Problems

## Problem 1

$$\frac{10 - 9 + 8 - 7 + 6 - 5 + 4 - 3 + 2 - 1}{1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + 9} =$$

(A) $-1$ (B) $1$ (C) $5$ (D) $9$ (E) $10$

## Problem 2

Which of the following is not equal to $\dfrac{5}{4}$?

(A) $\dfrac{10}{8}$ (B) $1\dfrac{1}{4}$ (C) $1\dfrac{3}{12}$ (D) $1\dfrac{1}{5}$ (E) $1\dfrac{10}{40}$

## Problem 3

What is the largest difference that can be formed by subtracting two numbers chosen from the set $\{-16, -4, 0, 2, 4, 12\}$?
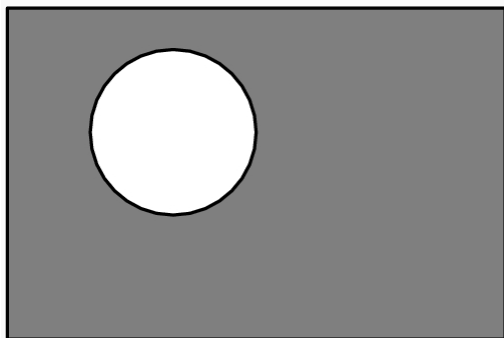
(A) $10$ (B) $12$ (C) $16$ (D) $28$ (E) $48$

## Problem 4

During the softball season, Judy had $35$ hits. Among her hits were $1$ home run, $1$ triple and $5$ doubles. The rest of her hits were singles. What percent of her hits were singles?

(A) $28\%$ (B) $35\%$ (C) $70\%$ (D) $75\%$ (E) $80\%$

## Problem 5

A circle of diameter $1$ is removed from a $2 \times 3$ rectangle, as shown. Which whole number is closest to the area of the shaded region?

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

# Problem 6

Suppose that $\triangle\ \begin{smallmatrix}a\\b\ \ c\end{smallmatrix}$ means $a + b - c$. For example, $\triangle\ \begin{smallmatrix}5\\4\ \ 6\end{smallmatrix}$ is $5 + 4 - 6 = 3$. Then the sum $\triangle\ \begin{smallmatrix}1\\3\ \ 4\end{smallmatrix} + \triangle\ \begin{smallmatrix}2\\5\ \ 6\end{smallmatrix}$ is

(A) $-2$    (B) $-1$    (C) 0    (D) 1    (E) 2

# Problem 7

The digit-sum of $998$ is $9 + 9 + 8 = 26$. How many 3-digit whole numbers, whose digit-sum is $26$, are even?
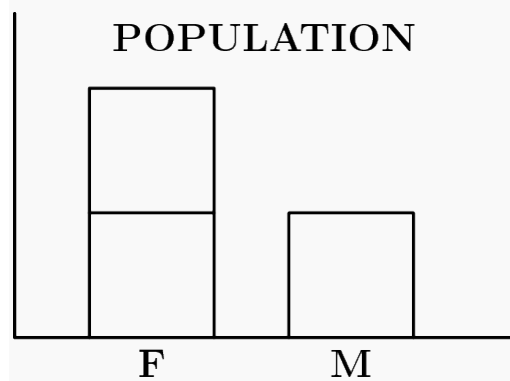
(A) 1    (B) 2    (C) 3    (D) 4    (E) 5

# Problem 8

A store owner bought $1500$ pencils at $\$0.10$ each. If he sells them for $\$0.25$ each, how many of them must he sell to make a profit of exactly $\$100.00$?

(A) 400    (B) 667    (C) 1000    (D) 1500    (E) 1900
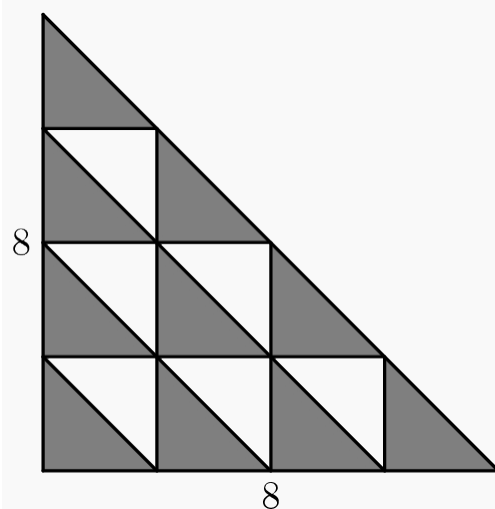
# Problem 9

The population of a small town is $480$. The graph indicates the number of females and males in the town, but the vertical scale-values are omitted. How many males live in the town?

POPULATION



F          M

(A) 120      (B) 160      (C) 200      (D) 240      (E) 360
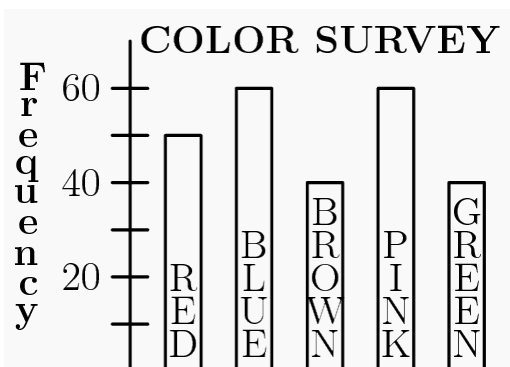
## Problem 10

An isosceles right triangle with legs of length $8$ is partitioned into $16$ congruent triangles as shown. The shaded area is



(A) 10      (B) 20      (C) 32      (D) 40      (E) 64

## Problem 11

The bar graph shows the results of a survey on color preferences. What percent preferred blue?

**COLOR SURVEY**



(A) 20%  (B) 24%  (C) 30%  (D) 36%  (E) 42%

## Problem 12

The five tires of a car (four road tires and a full-sized spare) were rotated so that each tire was used the same number of miles during the first $30,000$ miles the car traveled. For how many miles was each tire used?

(A) 6000  (B) 7500  (C) 24,000  (D) 30,000  (E) 37,500

## Problem 13

Five test scores have a mean (average score) of $90$, a median (middle score) of $91$ and a mode (most frequent score) of $94$. The sum of the two lowest test scores is

(A) 170  (B) 171  (C) 176  (D) 177  (E) not determined by the information giv

## Problem 14

When four gallons are added to a tank that is one-third full, the tank is then one-half full. The capacity of the tank in gallons is
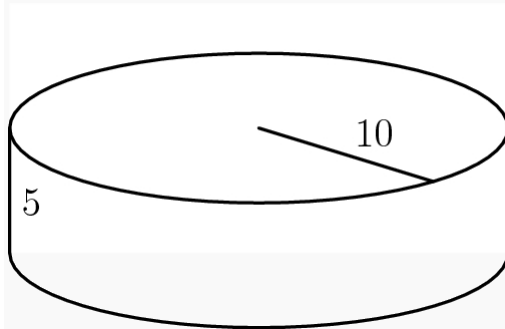
(A) 8  (B) 12  (C) 20  (D) 24  (E) 48

## Problem 15

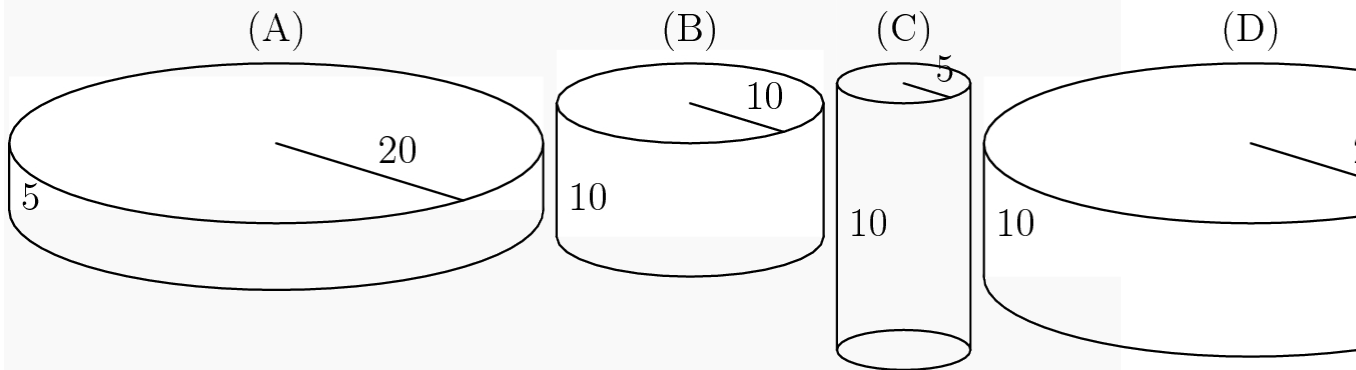What is the $1992^{\text{nd}}$ letter in this sequence?

ABCDEDCBAABCDEDCBAABCDEDCBAABCDEDC$\cdots$

(A) A  (B) B  (C) C  (D) D  (E) E
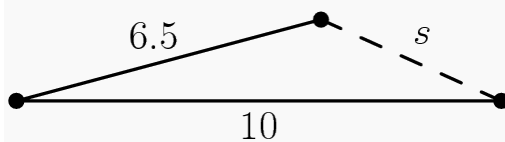
# Problem 16

Which cylinder has twice the volume of the cylinder shown above?

(A)    (B)    (C)    (D)

(E) None of the above

# Problem 17

The sides of a triangle have lengths $6.5$, $10$, and $s$, where $s$ is a whole number. What is the smallest possible value of $s$?

(A) $3$    (B) $4$    (C) $5$    (D) $6$    (E) $7$

# Problem 18

On a trip, a car traveled $80$ miles in an hour and a half, then was stopped in traffic for $30$ minutes, then traveled $100$ miles during the next $2$ hours. What was the car's average speed in miles per hour for the $4$-hour trip?
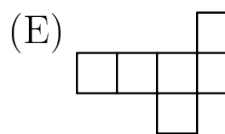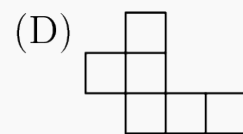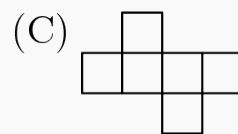
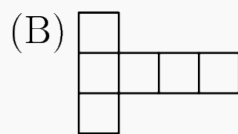(A) $45$     (B) $50$     (C) $60$     (D) $75$     (E) $90$

# Problem 19

The distance between the $5^{\text{th}}$ and $26^{\text{th}}$ exits on an interstate highway is $118$ miles. If any two exits are at least $5$ miles apart, then what is the largest number of miles there can be between two consecutive exits that are between the $5^{\text{th}}$ and $26^{\text{th}}$ exits?

(A) $8$     (B) $13$     (C) $18$     (D) $47$     (E) $98$
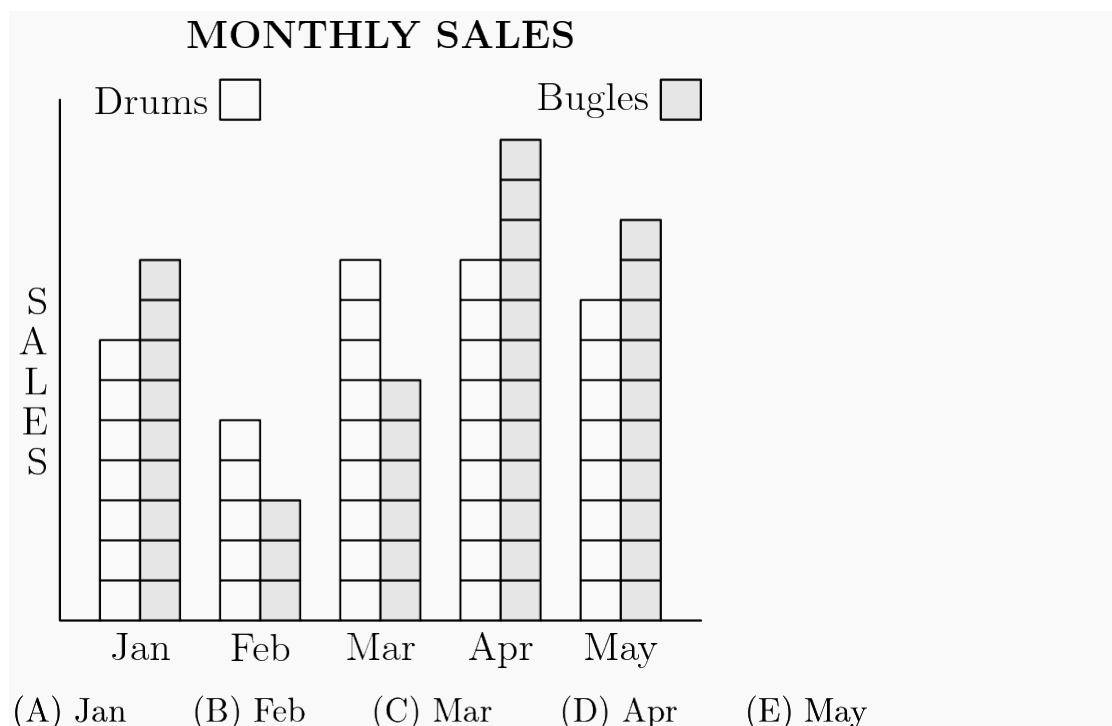
# Problem 20

Which pattern of identical squares could NOT be folded along the lines shown to form a cube?

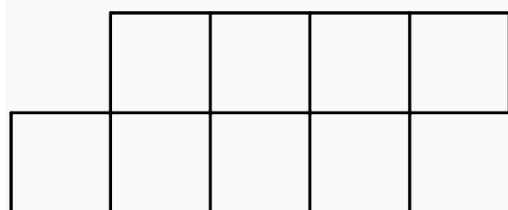(A)     (B)     (C)     (D)     (E)

# Problem 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?

## MONTHLY SALES

Drums ☐                     Bugles ☐

S
A
L
E
S

Jan    Feb    Mar    Apr    May

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

# Problem 22

Eight $1 \times 1$ square tiles are arranged as shown so their outside edges form a polygon with a perimeter of $14$ units. Two additional tiles of the same size are added to the figure so that at least one side of each tile is shared with a side of one of the squares in the original figure. Which of the following could be the perimeter of the new figure?
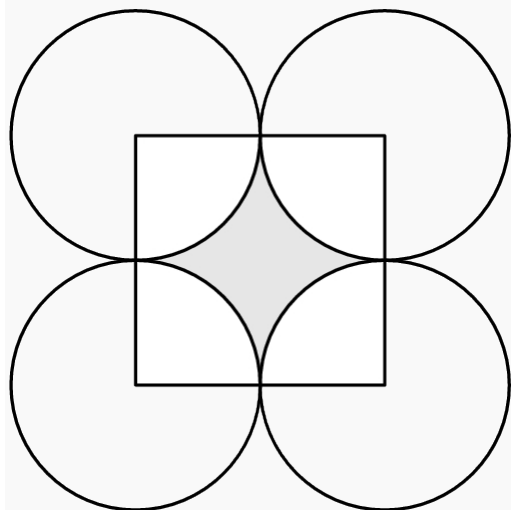
(A) 15     (B) 17     (C) 18     (D) 19     (E) 20

# Problem 23

If two dice are tossed, the probability that the product of the numbers showing on the tops of the dice is greater than $10$ is

(A) $\dfrac{3}{7}$     (B) $\dfrac{17}{36}$     (C) $\dfrac{1}{2}$     (D) $\dfrac{5}{8}$     (E) $\dfrac{11}{12}$

# Problem 24

Four circles of radius $3$ are arranged as shown. Their centers are the vertices of a square. The area of the shaded region is closest to



(A) 7.7    (B) 12.1    (C) 17.2    (D) 18    (E) 27

# Problem 25

One half of the water is poured out of a full container. Then one third of the remainder is poured out. Continue the process: one fourth of the remainder for the third pouring, one fifth of the remainder for the fourth pouring, etc. After how many pourings does exactly one tenth of the original water remain?

(A) 6    (B) 7    (C) 8    (D) 9    (E) 10