

USA  
AMC 8  
1985

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1  $\frac{3 \times 5}{9 \times 11} \times \frac{7 \times 9 \times 11}{3 \times 5 \times 7} =$

- (A) 1    (B) 0    (C) 49    (D)  $\frac{1}{49}$     (E) 50

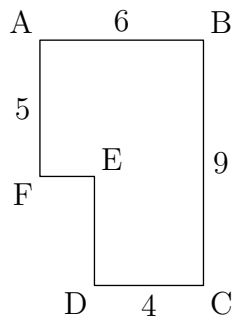
2  $90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99 =$

- (A) 845    (B) 945    (C) 1005    (D) 1025    (E) 1045

3  $\frac{10^7}{5 \times 10^4} =$

- (A) .002    (B) .2    (C) 20    (D) 200    (E) 2000

4 The area of polygon  $ABCDEF$ , in square units, is

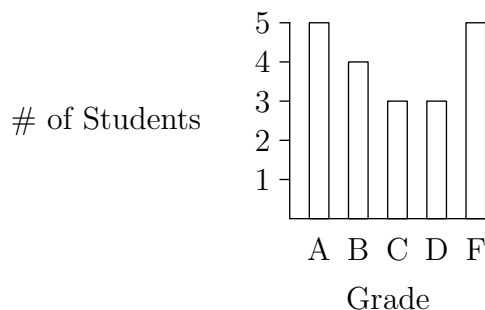


All angles in this diagram are right.

- (A) 24    (B) 30    (C) 46    (D) 66    (E) 74

USA  
AMC 8  
1985

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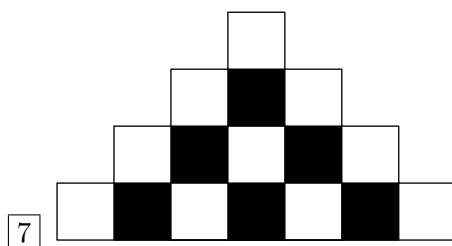
5

The bar graph shows the grades in a mathematics class for the last grading period. If A, B, C, and D are satisfactory grades, what fraction of the grades shown in the graph are satisfactory?

- (A)  $\frac{1}{2}$     (B)  $\frac{2}{3}$     (C)  $\frac{3}{4}$     (D)  $\frac{4}{5}$     (E)  $\frac{9}{10}$

6 A ream of paper containing 500 sheets is 5 cm thick. Approximately how many sheets of this type of paper would there be in a stack 7.5 cm high?

- (A) 250    (B) 550    (C) 667    (D) 750    (E) 1250



A "stair-step" figure is made up of alternating black and white squares in each row. Rows 1 through 4 are shown. All rows begin and end with a white square. The number of black squares in the 37th row is

- (A) 34    (B) 35    (C) 36    (D) 37    (E) 38

8 If  $a = -2$ , the largest number in the set  $\{-3a, 4a, \frac{24}{a}, a^2, 1\}$  is

- (A)  $-3a$     (B)  $4a$     (C)  $\frac{24}{a}$     (D)  $a^2$     (E) 1

**USA**  
**AMC 8**  
1985

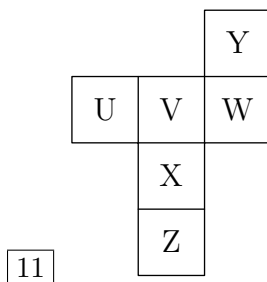
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9 The product of the 9 factors  $(1 - \frac{1}{2})(1 - \frac{1}{3})(1 - \frac{1}{4}) \dots (1 - \frac{1}{10}) =$

- (A)  $\frac{1}{10}$     (B)  $\frac{1}{9}$     (C)  $\frac{1}{2}$     (D)  $\frac{10}{11}$     (E)  $\frac{11}{2}$

10 The fraction halfway between  $\frac{1}{5}$  and  $\frac{1}{3}$  (on the number line) is

- (A)  $\frac{1}{4}$     (B)  $\frac{2}{15}$     (C)  $\frac{4}{15}$     (D)  $\frac{53}{200}$     (E)  $\frac{8}{15}$



A piece of paper containing six joined squares labeled as shown in the diagram is folded along the edges of the squares to form a cube. The label of the face opposite the face labeled X is:

- (A) Z    (B) U    (C) V    (D) W    (E) Y

12 A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6.2 cm, 8.3 cm, and 9.5 cm. The area of the square is

- (A)  $24 \text{ cm}^2$     (B)  $36 \text{ cm}^2$     (C)  $48 \text{ cm}^2$     (D)  $64 \text{ cm}^2$     (E)  $144 \text{ cm}^2$

13 If you walk for 45 minutes at a rate of 4 mph and then run for 30 minutes at a rate of 10 mph, how many miles have you gone at the end of one hour and 15 minutes?

- (A) 3.5 miles    (B) 8 miles    (C) 9 miles    (D)  $25\frac{1}{3}$  miles    (E) 480 miles

14 The difference between a 6.5% sales tax and a 6% sales tax on an item priced at \$20 before tax is

- (A) \$.01    (B) \$.10    (C) \$.50    (D) \$1    (E) \$10

**USA**  
**AMC 8**  
1985

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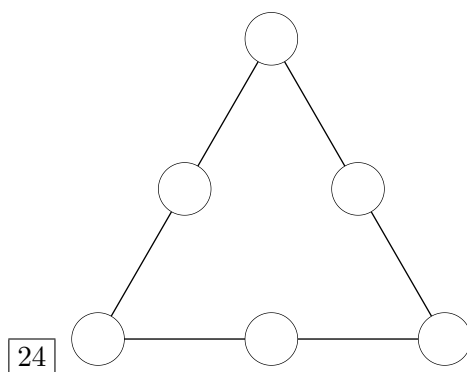
- 15] How many whole numbers between 100 and 400 contain the digit 2?
- (A) 100    (B) 120    (C) 138    (D) 140    (E) 148
- 16] The ratio of boys to girls in Mr. Brown's math class is 2 : 3. If there are 30 students in the class, how many more girls than boys are in the class?
- (A) 1    (B) 3    (C) 5    (D) 6    (E) 10
- 17] If your average score on your first six mathematics tests was 84 and your average score on your first seven mathematics tests was 85, then your score on the seventh test was
- (A) 86    (B) 88    (C) 90    (D) 91    (E) 92
- 18] Nine copies of a certain pamphlet cost less than \$10.00 while ten copies of the same pamphlet (at the same price) cost more than \$11.00. How much does one copy of this pamphlet cost?
- (A) \$1.07    (B) \$1.08    (C) \$1.09    (D) \$1.10    (E) \$1.11
- 19] If the length and width of a rectangle are each increased by 10%, then the perimeter of the rectangle is increased by
- (A) 1%    (B) 10%    (C) 20%    (D) 21%    (E) 40%
- 20] In a certain year, January had exactly four Tuesdays and four Saturdays. On what day did January 1 fall that year?
- (A) Monday    (B) Tuesday    (C) Wednesday    (D) Friday    (E) Saturday
- 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%
- 22] Assume every 7-digit whole number is a possible telephone number except those which begin with 0 or 1. What fraction of telephone numbers begin with 9 and end with 0?
- (A)  $\frac{1}{63}$     (B)  $\frac{1}{80}$     (C)  $\frac{1}{81}$     (D)  $\frac{1}{90}$     (E)  $\frac{1}{100}$

USA  
AMC 8  
1985

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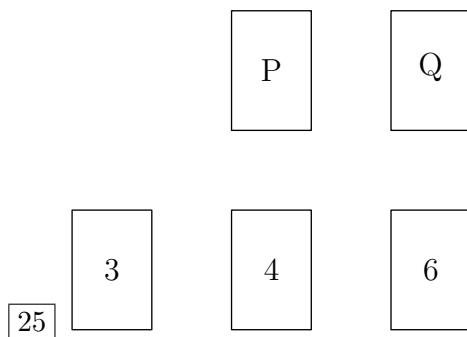
23 King Middle School has 1200 students. Each student takes 5 classes a day. Each teacher teaches 4 classes. Each class has 30 students and 1 teacher. How many teachers are there at King Middle School?

- (A) 30    (B) 32    (C) 40    (D) 45    (E) 50



In a magic triangle, each of the six whole numbers 10 – 15 is placed in one of the circles so that the sum,  $S$ , of the three numbers on each side of the triangle is the same. The largest possible value for  $S$  is

- (A) 36    (B) 37    (C) 38    (D) 39    (E) 40



Five cards are lying on a table as shown. Each card has a letter on one side and a whole number on the other side. Jane said, "If a vowel is on one side of any card, then an even number is on the other side." Mary showed Jane was wrong by turning over one card. Which card did Mary turn over?

USA  
AMC 8  
1985

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(A) 3    (B) 4    (C) 6    (D) P    (E) Q

**USA**  
**AMC 8**  
1986

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- 1 In July 1861, 366 inches of rain fell in Cherrapunji, India. What was the average rainfall in inches per hour during that month?

(A)  $\frac{366}{31 \times 24}$     (B)  $\frac{366 \times 31}{24}$     (C)  $\frac{366 \times 24}{31}$     (D)  $\frac{31 \times 24}{366}$     (E)  $366 \times 31 \times 24$

- 2 Which of the following numbers has the largest reciprocal?

(A)  $\frac{1}{3}$     (B)  $\frac{2}{5}$     (C) 1    (D) 5    (E) 1986

- 3 The smallest sum one could get by adding three different numbers from the set  $\{7, 25, -1, 12, -3\}$  is

(A) -3    (B) -1    (C) 3    (D) 5    (E) 21

- 4 The product  $(1.8)(40.3 + .07)$  is closest to

(A) 7    (B) 42    (C) 74    (D) 84    (E) 737

- 5 A contest began at noon one day and ended 1000 minutes later. At what time did the contest end?

(A) 10 : 00 p.m.    (B) midnight    (C) 2 : 30 a.m.    (D) 4 : 40 a.m.    (E) 6 : 40 a.m.

6  $\frac{2}{1-\frac{2}{3}} =$

(A) -3    (B)  $-\frac{4}{3}$     (C)  $\frac{2}{3}$     (D) 2    (E) 6

- 7 How many whole numbers are between  $\sqrt{8}$  and  $\sqrt{80}$ ?

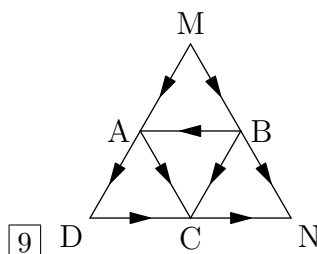
(A) 5    (B) 6    (C) 7    (D) 8    (E) 9

- 8 In the product  $B2 \times 7B = 6396$ ,  $B$  is a digit. The value of  $B$  is

(A) 3    (B) 5    (C) 6    (D) 7    (E) 8

USA  
AMC 8  
1986

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Using only the paths and the directions shown, how many different routes are there from  $M$  to  $N$ ?

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

10 A picture 3 feet across is hung in the center of a wall that is 19 feet wide. How many feet from the end of the wall is the nearest edge of the picture?

- (A)  $1\frac{1}{2}$     (B) 8    (C)  $9\frac{1}{2}$     (D) 16    (E) 22

11 If  $A \star B$  means  $\frac{A+B}{2}$ , then  $(3 \star 5) \star 8$  is

- (A) 6    (B) 8    (C) 12    (D) 16    (E) 30

12

		TEST 2				
		A	B	C	D	F
TEST 1	A	2	2	1	0	0
	B	1	4	3	0	0
	C	1	3	5	2	0
	D	0	0	1	1	1
	F	0	0	2	1	0

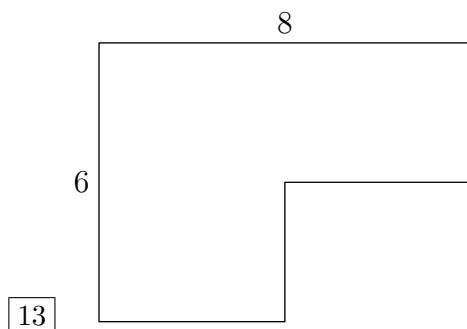
The table displays the grade distribution of the 30 students in a mathematics class on the last two tests. For example, exactly one student received a "D" on Test 1 and a "C" on Test 2. What percent of the students received the same grade on both tests?

- (A) 12%    (B) 25%    (C)  $33\frac{1}{3}\%$     (D) 40%    (E) 50%



USA  
AMC 8  
1986

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Given that all angles shown are marked, the perimeter of the polygon shown is

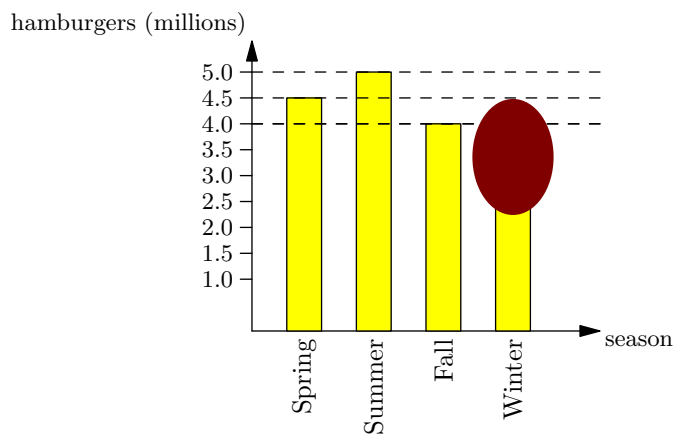
- (A) 14    (B) 20    (C) 28    (D) 48    (E) cannot be determined from the information given

14 If  $200 \leq a \leq 400$  and  $600 \leq b \leq 1200$ , then the largest value of the quotient  $\frac{b}{a}$  is

- (A)  $\frac{3}{2}$     (B) 3    (C) 6    (D) 300    (E) 600

15 Sale prices at the Ajax Outlet Store are 50% below original prices. On Saturdays an additional discount of 20% off the sale price is given. What is the Saturday price of a coat whose original price is \$180?

- (A) \$54    (B) \$72    (C) \$90    (D) \$108    (E) \$110



**USA**  
**AMC 8**  
1986

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A bar graph shows the number of hamburgers sold by a fast food chain each season. However, the bar indicating the number sold during the winter is covered by a smudge. If exactly 25% of the chain's hamburgers are sold in the fall, how many million hamburgers are sold in the winter?

- (A) 2.5    (B) 3    (C) 3.5    (D) 4    (E) 4.5

- 17] Let  $o$  be an odd whole number and let  $n$  be any whole number. Which of the following statements about the whole number  $(o^2 + no)$  is always true?

(A) it is always odd (B) it is always even (C) it is even only if  $n$  is even (D) it is odd only if  $n$  is odd (E) it is

- 18] A rectangular grazing area is to be fenced off on three sides using part of a 100 meter rock wall as the fourth side. Fence posts are to be placed every 12 meters along the fence including the two posts where the fence meets the rock wall. What is the fewest number of posts required to fence an area 36 m by 60 m?

- (A) 11    (B) 12    (C) 13    (D) 14    (E) 16

- 19] At the beginning of a trip, the mileage odometer read 56200 miles. The driver filled the gas tank with 6 gallons of gasoline. During the trip, the driver filled his tank again with 12 gallons of gasoline when the odometer read 56560. At the end of the trip, the driver filled the tank again with 20 gallons of gasoline. The odometer read 57060. To the nearest tenth, what was the car's average miles-per-gallon for the entire trip?

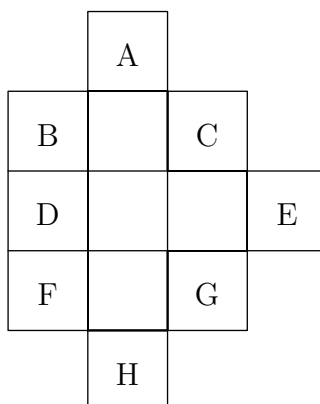
- (A) 22.5    (B) 22.6    (C) 24.0    (D) 26.9    (E) 27.5

- 20] The value of the expression  $\frac{(304)^5}{(29.7)(399)^4}$  is closest to

- (A) .003    (B) .03    (C) .3    (D) 3    (E) 30

USA  
AMC 8  
1986

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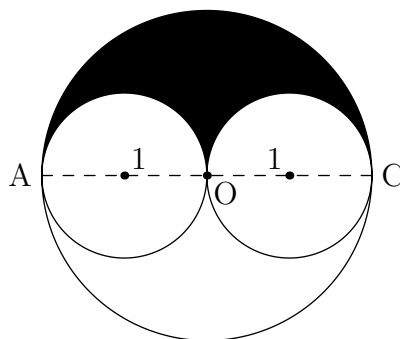
21

Suppose one of the eight lettered identical squares is included with the four squares in the T-shaped figure outlined. How many of the resulting figures can be folded into a topless cubical box?

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

- 22 Alan, Beth, Carlos, and Diana were discussing their possible grades in mathematics class this grading period. Alan said, "If I get an A, then Beth will get an A." Beth said, "If I get an A, then Carlos will get an A." Carlos said, "If I get an A, then Diana will get an A." All of these statements were true, but only two of the students received an A. Which two received A's?

- (A) Alan, Beth    (B) Beth, Carlos    (C) Carlos, Diana    (D) Alan, Diana    (E) Beth, Diana



23

USA  
AMC 8  
1986

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The large circle has diameter  $\overline{AC}$ . The two small circles have their centers on  $\overline{AC}$  and just touch at  $O$ , the center of the large circle. If each small circle has radius 1, what is the value of the ratio of the area of the shaded region to the area of one of the small circles?

(A) between  $\frac{1}{2}$  and 1      (B) 1      (C) between 1 and  $\frac{3}{2}$       (D) between  $\frac{3}{2}$  and 2 (E) cannot be determined

- 24 The 600 students at King Middle School are divided into three groups of equal size for lunch. Each group has lunch at a different time. A computer randomly assigns each student to one of the three lunch groups. The probability that the three friends, Al, Bob, and Carol, will be assigned to the same lunch group is approximately:

(A)  $\frac{1}{27}$       (B)  $\frac{1}{9}$       (C)  $\frac{1}{8}$       (D)  $\frac{1}{6}$       (E)  $\frac{1}{3}$

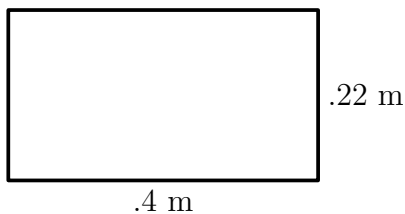
- 25 Which of the following sets of whole numbers has the largest average?

(A) multiples of 2 between 1 and 101      (B) multiples of 3 between 1 and 101 (C) multiples of 4 between 1 and 101

USA  
AMC 8  
1987

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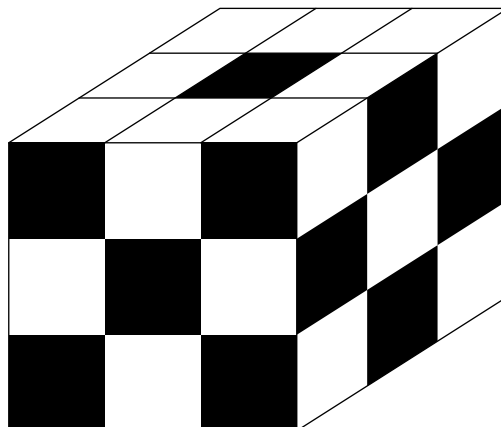
- 1  $.4 + .02 + .006 =$   
(A) .012    (B) .066    (C) .12    (D) .24    (E) .426
- 2  $\frac{2}{25} =$   
(A) .008    (B) .08    (C) .8    (D) 1.25    (E) 12.5
- 3  $2(81 + 83 + 85 + 87 + 89 + 91 + 93 + 95 + 97 + 99) =$   
(A) 1600    (B) 1650    (C) 1700    (D) 1750    (E) 1800
- 4 Martians measure angles in clerts. There are 500 clerts in a full circle. How many clerts are there in a right angle?  
(A) 90    (B) 100    (C) 125    (D) 180    (E) 250
- 5 The area of the rectangular region is



- (A)  $.088 \text{ m}^2$     (B)  $.62 \text{ m}^2$     (C)  $.88 \text{ m}^2$     (D)  $1.24 \text{ m}^2$     (E)  $4.22 \text{ m}^2$
- 6 The smallest product one could obtain by multiplying two numbers in the set  $\{-7, -5, -1, 1, 3\}$  is  
(A)  $-35$     (B)  $-21$     (C)  $-15$     (D)  $-1$     (E)  $3$
- 7 The large cube shown is made up of 27 identical sized smaller cubes. For each face of the large cube, the opposite face is shaded the same way. The total number of smaller cubes that must have at least one face shaded is

USA  
AMC 8  
1987

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- (A) 10    (B) 16    (C) 20    (D) 22    (E) 24

8 If A and B are nonzero digits, then the number of digits (not necessarily different) in the sum of the three whole numbers is

$$\begin{array}{r}
 9 \quad 8 \quad 7 \quad 6 \\
 A \quad 3 \quad 2 \\
 B \quad 1 \\
 \hline
 \end{array}$$

- (A) 4    (B) 5    (C) 6    (D) 9    (E) depends on the values of A and B

9 When finding the sum  $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}$ , the least common denominator used is

- (A) 120    (B) 210    (C) 420    (D) 840    (E) 5040

10  $4(299) + 3(299) + 2(299) + 298 =$

- (A) 2889    (B) 2989    (C) 2991    (D) 2999    (E) 3009

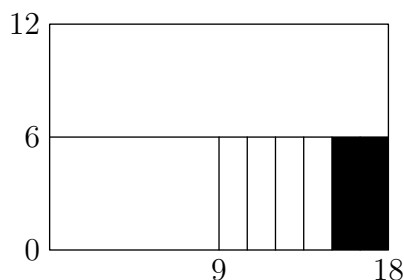
11 The sum  $2\frac{1}{7} + 3\frac{1}{2} + 5\frac{1}{19}$  is between

- (A) 10 and  $10\frac{1}{2}$     (B)  $10\frac{1}{2}$  and 11    (C) 11 and  $11\frac{1}{2}$     (D)  $11\frac{1}{2}$  and 12    (E) 12 and  $12\frac{1}{2}$

12 What fraction of the large 12 by 18 rectangular region is shaded?

USA  
AMC 8  
1987

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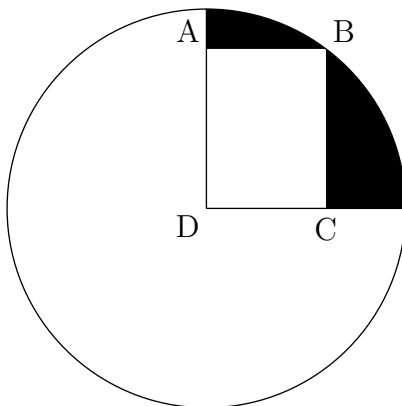


- (A)  $\frac{1}{108}$     (B)  $\frac{1}{18}$     (C)  $\frac{1}{12}$     (D)  $\frac{2}{9}$     (E)  $\frac{1}{3}$
- 13 Which of the following fractions has the largest value?  
(A)  $\frac{3}{7}$     (B)  $\frac{4}{9}$     (C)  $\frac{17}{35}$     (D)  $\frac{100}{201}$     (E)  $\frac{151}{301}$
- 14 A computer can do 10,000 additions per second. How many additions can it do in one hour?  
(A) 6 million    (B) 36 million    (C) 60 million    (D) 216 million    (E) 360 million
- 15 The sale ad read: "Buy three tires at the regular price and get the fourth tire for \$3." Sam paid \$240 for a set of four tires at the sale. What was the regular price of one tire?  
(A) 59.25 dollars    (B) 60 dollars    (C) 70 dollars    (D) 79 dollars    (E) 80 dollars
- 16 Joyce made 12 of her first 30 shots in the first three games of this basketball game, so her seasonal shooting average was 40%. In her next game, she took 10 shots and raised her seasonal shooting average to 50%. How many of these 10 shots did she make?  
(A) 2    (B) 3    (C) 5    (D) 6    (E) 8
- 17 Abby, Bret, Carl, and Dana are seated in a row of four seats numbered 1 to 4. Joe looks at them and says:  
"Bret is next to Carl." "Abby is between Bret and Carl."  
However each one of Joe's statements is false. Bret is actually sitting in seat 3. Who is sitting in seat 2?  
(A) Abby    (B) Bret    (C) Carl    (D) Dana    (E) There is not enough information to be sure.
- 18 Half the people in a room left. One third of those remaining started to dance. There were then 12 people who were not dancing. The original number of people in the room was  
(A) 24    (B) 30    (C) 36    (D) 42    (E) 72

USA  
AMC 8  
1987

---

- [19] A calculator has a squaring key  $x^2$  which replaces the current number displayed with its square. For example, if the display is 000003 and the  $x^2$  key is depressed, then the display becomes 000009. If the display reads 000002, how many times must you depress the  $x^2$  key to produce a displayed number greater than 500?
- (A) 4    (B) 5    (C) 8    (D) 9    (E) 250
- [20] "If a whole number  $n$  is not prime, then the whole number  $n - 2$  is not prime." A value of  $n$  which shows this statement to be false is
- (A) 9    (B) 12    (C) 13    (D) 16    (E) 23
- [21] Suppose  $n^*$  means  $\frac{1}{n}$ , the reciprocal of  $n$ . For example,  $5^* = \frac{1}{5}$ . How many of the following statements are true?
- i)  $3^* + 6^* = 9^*$  ii)  $6^* - 4^* = 2^*$  iii)  $2^* \cdot 6^* = 12^*$  iv)  $10^* \div 2^* = 5^*$
- (A) 0    (B) 1    (C) 2    (D) 3    (E) 4
- [22] ABCD is a rectangle, D is the center of the circle, and B is on the circle. If  $AD = 4$  and  $CD = 3$ , then the area of the shaded region is between



- (A) 4 and 5    (B) 5 and 6    (C) 6 and 7    (D) 7 and 8    (E) 8 and 9
- [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?



USA  
AMC 8  
1987

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

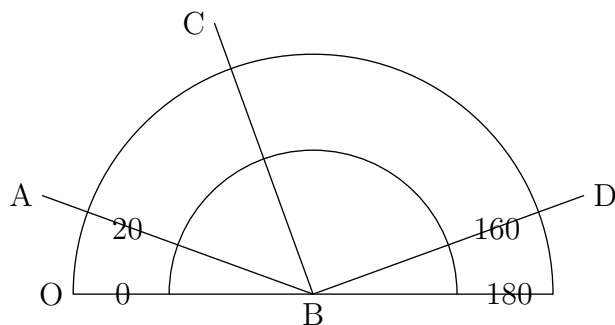
- (A) 20%    (B) 25%    (C) 40%    (D) 56%    (E) 80%

- 24] A multiple choice examination consists of 20 questions. The scoring is +5 for each correct answer,  $-2$  for each incorrect answer, and 0 for each unanswered question. John's score on the examination is 48. What is the maximum number of questions he could have answered correctly?
- (A) 9    (B) 10    (C) 11    (D) 12    (E) 16
- 25] Ten balls numbered 1 to 10 are in a jar. Jack reaches into the jar and randomly removes one of the balls. Then Jill reaches into the jar and randomly removes a different ball. The probability that the sum of the two numbers on the balls removed is even is
- (A)  $\frac{4}{9}$     (B)  $\frac{9}{19}$     (C)  $\frac{1}{2}$     (D)  $\frac{10}{19}$     (E)  $\frac{5}{9}$

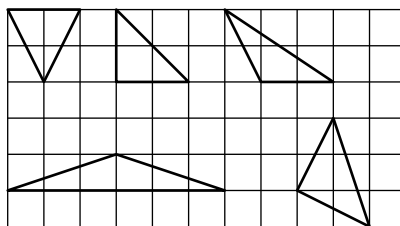


USA  
AMC 8  
1988

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- (A)  $20^\circ$     (B)  $40^\circ$     (C)  $50^\circ$     (D)  $70^\circ$     (E)  $120^\circ$
- 6  $\frac{(.2)^3}{(.02)^2} =$  (A) .2    (B) 2    (C) 10    (D) 15    (E) 20
- 7  $2.46 \times 8.163 \times (5.17 + 4.829)$  is closest to:  
 (A) 100    (B) 200    (C) 300    (D) 400    (E) 500
- 8 Betty used a calculator to find the product  $0.075 \times 2.56$ . She forgot to enter the decimal points. The calculator showed 19200. If Betty had entered the decimal points correctly, the answer would have been  
 (A) .0192    (B) .192    (C) 1.92    (D) 19.2    (E) 192
- 9 An isosceles triangle is a triangle with two sides of equal length. How many of the five triangles on the square grid below are isosceles?

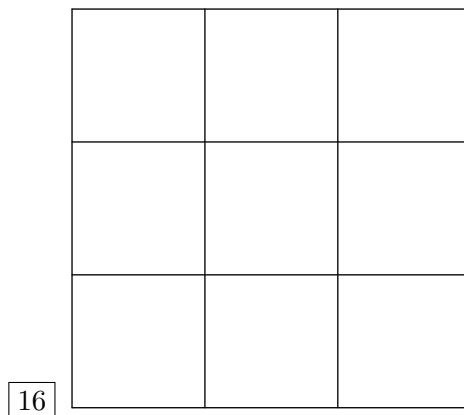


- (A) 1    (B) 2    (C) 3    (D) 4    (E) 5
- 10 Chris' birthday is on a Thursday this year. What day of the week will it be 60 days after her birthday?  
 (A) Monday    (B) Wednesday    (C) Thursday    (D) Friday    (E) Saturday

USA  
AMC 8  
1988

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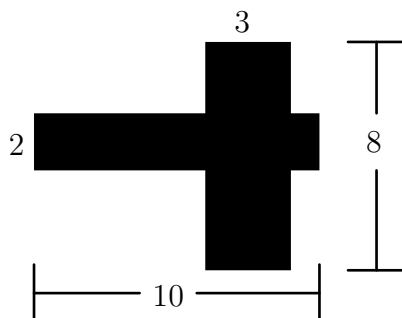
- 11  $\sqrt{164}$  is  
(A) 42    (B) less than 10    (C) between 10 and 11    (D) between 11 and 12    (E) between 12 and 13
- 12 Suppose the estimated 20 billion dollar cost to send a person to the planet Mars is shared equally by the 250 million people in the U.S. Then each person's share is  
(A) 40 dollars    (B) 50 dollars    (C) 80 dollars    (D) 100 dollars    (E) 125 dollars
- 13 If rose bushes are spaced about 1 foot apart, approximately how many bushes are needed to surround a circular patio whose radius is 12 feet?  
(A) 12    (B) 38    (C) 48    (D) 75    (E) 450
- 14  $\diamond$  and  $\Delta$  are whole numbers and  $\diamond \times \Delta = 36$ . The largest possible value of  $\diamond + \Delta$  is  
(A) 12    (B) 13    (C) 15    (D) 20    (E) 37
- 15 The reciprocal of  $(\frac{1}{2} + \frac{1}{3})$  is  
(A)  $\frac{1}{6}$     (B)  $\frac{2}{5}$     (C)  $\frac{6}{5}$     (D)  $\frac{5}{2}$     (E) 5



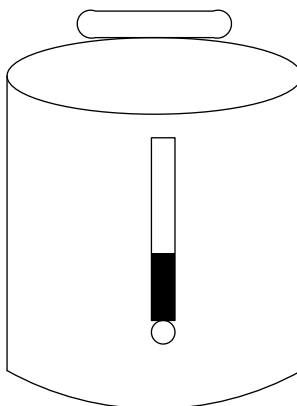
- Placing no more than one  $x$  in each small square, what is the greatest number of  $x$ 's that can be put on the grid shown without getting three  $x$ 's in a row vertically, horizontally, or diagonally?  
(A) 2    (B) 3    (C) 4    (D) 5    (E) 6
- 17 The shaded region formed by the two intersecting perpendicular rectangles, in square units, is

USA  
AMC 8  
1988

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- (A) 23    (B) 38    (C) 44    (D) 46    (E) unable to be determined from the information given
- 18] The average weight of 6 boys is 150 pounds and the average weight of 4 girls is 120 pounds. The average weight of the 10 children is  
(A) 135 pounds    (B) 137 pounds    (C) 138 pounds    (D) 140 pounds    (E) 141 pounds
- 19] What is the 100th number in the arithmetic sequence: 1, 5, 9, 13, 17, 21, 25, ...  
(A) 397    (B) 399    (C) 401    (D) 403    (E) 405
- 20] The glass gauge on a cylindrical coffee maker shows that there are 45 cups left when the coffee maker is 36% full. How many cups of coffee does it hold when it is full?

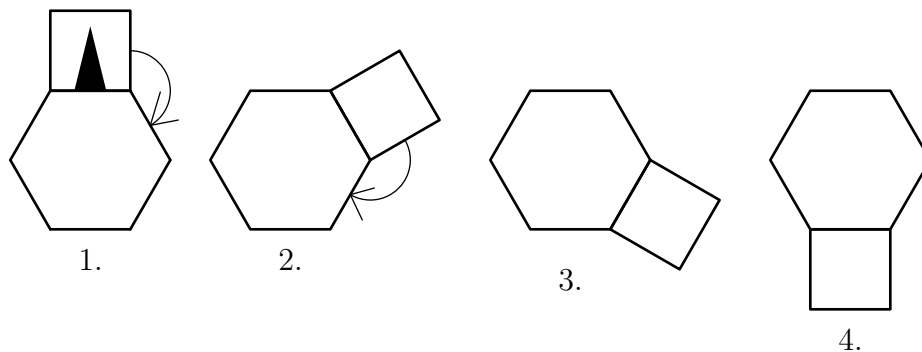


- (A) 80    (B) 100    (C) 125    (D) 130    (E) 262

USA  
AMC 8  
1988

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- 21] A fifth number,  $n$ , is added to the set  $\{3, 6, 9, 10\}$  to make the mean of the set of five numbers equal to its median. The number of possible values of  $n$  is  
 (A) 1 (B) 2 (C) 3 (D) 4 (E) more than 4
- 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 more than 5%. (C) The sale price is higher than the original price, but by less than 5%. (D) The sale price is lower than the original price. (E) The sale price is the same as the original price.
- 23] Maria buys computer disks at a price of 4 for 5 dollars and sells them at a price of 3 for 5 dollars. How many computer disks must she sell in order to make a profit of 100 dollars?  
 (A) 100 (B) 120 (C) 200 (D) 240 (E) 1200



24]

The square in the first diagram "rolls" clockwise around the fixed regular hexagon until it reaches the bottom. In which position will the solid triangle be in diagram 4?



- 25] A **palindrome** is a whole number that reads the same forwards and backwards. If one neglects the colon, certain times displayed on a digital watch are palindromes. Three examples are:  $\boxed{1:01}$ ,  $\boxed{12:21}$ . How many times during a 12-hour period will be palindromes?

USA  
AMC 8  
1988

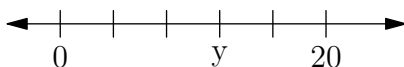
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(A) 57    (B) 60    (C) 63    (D) 90    (E) 93

USA  
AMC 8  
1989

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- 1  $(1 + 11 + 21 + 31 + 41) + (9 + 19 + 29 + 39 + 49) =$   
(A) 150    (B) 199    (C) 200    (D) 249    (E) 250
- 2  $\frac{2}{10} + \frac{4}{100} + \frac{6}{1000} =$   
(A) .012    (B) .0246    (C) .12    (D) .246    (E) 246
- 3 Which of the following numbers is the largest?  
(A) .99    (B) .9099    (C) .9    (D) .909    (E) .9009
- 4 Estimate to determine which of the following numbers is closest to  $\frac{401}{.205}$ .  
(A) .2    (B) 2    (C) 20    (D) 200    (E) 2000
- 5  $-15 + 9 \times (6 \div 3) =$   
(A) -48    (B) -12    (C) -3    (D) 3    (E) 12
- 6 If the markings on the number line are equally spaced, what is the number  $y$ ?



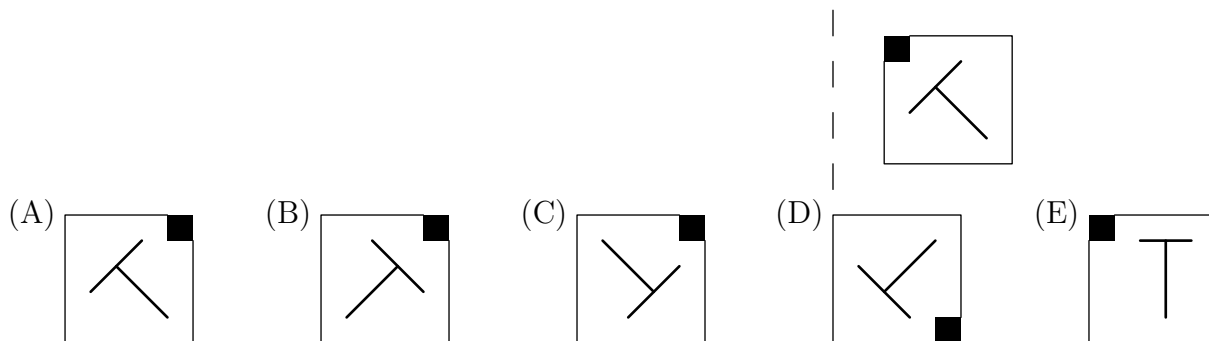
- (A) 3    (B) 10    (C) 12    (D) 15    (E) 16
- 7 If the value of 20 quarters and 10 dimes equals the value of 10 quarters and  $n$  dimes, then  $n =$   
(A) 10    (B) 20    (C) 30    (D) 35    (E) 45
- 8  $(2 \times 3 \times 4) \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right) =$   
(A) 1    (B) 3    (C) 9    (D) 24    (E) 26
- 9 There are 2 boys for every 3 girls in Ms. Johnson's math class. If there are 30 students in her class, what percent of them are boys?  
(A) 12%    (B) 20%    (C) 40%    (D) 60%    (E)  $66\frac{2}{3}\%$
- 10 What is the number of degrees in the smaller angle between the hour hand and the minute hand on a clock that reads seven o'clock?  
(A)  $50^\circ$     (B)  $120^\circ$     (C)  $135^\circ$     (D)  $150^\circ$     (E)  $165^\circ$



USA  
AMC 8  
1989

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- 11] Which of the five "T-like shapes" would be symmetric to the one shown with respect to the dashed line?



12]  $\frac{1-\frac{1}{3}}{1-\frac{1}{2}} =$

- (A)  $\frac{1}{3}$     (B)  $\frac{2}{3}$     (C)  $\frac{3}{4}$     (D)  $\frac{3}{2}$     (E)  $\frac{4}{3}$

13]  $\frac{9}{7 \times 53} =$

- (A)  $\frac{.9}{.7 \times 53}$     (B)  $\frac{.9}{.7 \times .53}$     (C)  $\frac{.9}{.7 \times 5.3}$     (D)  $\frac{.9}{7 \times .53}$     (E)  $\frac{.09}{.07 \times .53}$

- 14] When placing each of the digits 2, 4, 5, 6, 9 in exactly one of the boxes of this subtraction problem, what is the smallest difference that is possible?

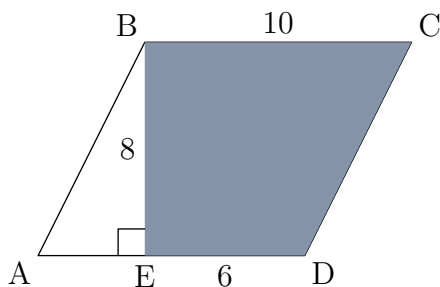
- (A) 58    (B) 123    (C) 149    (D) 171    (E) 176

$$\begin{array}{r} \square \square \square \\ - \quad \square \square \\ \hline \end{array}$$

- 15] The area of the shaded region BEDC in parallelogram ABCD is

USA  
AMC 8  
1989

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- (A) 24    (B) 48    (C) 60    (D) 64    (E) 80
- 16 In how many ways can 47 be written as the sum of two primes?  
(A) 0    (B) 1    (C) 2    (D) 3    (E) more than 3
- 17 The number N is between 9 and 17. The average of 6, 10, and N could be  
(A) 8    (B) 10    (C) 12    (D) 14    (E) 16
- 18 Many calculators have a reciprocal key  $\frac{1}{x}$  that replaces the current number displayed with its reciprocal. For example, if the display is 00004 and the  $\frac{1}{x}$  key is depressed, then the display becomes 000.25. If 00032 is currently displayed, what is the fewest number of times you must depress the  $\frac{1}{x}$  key so the display again reads 00032?  
(A) 1    (B) 2    (C) 3    (D) 4    (E) 5
- 19 The graph below shows the total accumulated dollars (in millions) spent by the Surf City government during 1988. For example, about .5 million had been spent by the beginning of February and approximately 2 million by the end of April. Approximately how many millions of dollars were spent during the summer months of June, July, and August?  
(A) 1.5    (B) 2.5    (C) 3.5    (D) 4.5    (E) 5.5



USA  
AMC 8  
1989

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- (A) 7    (B) 63    (C) 65    (D) 71    (E) 111

22 The letters A, J, H, S, M, E and the digits 1, 9, 8, 9 are "cycled" separately as follows and put together in a numbered list:

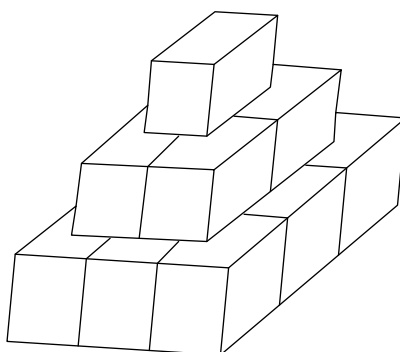
	AJHSME	1989
1.	JHSMEA	9891
2.	HSMEAJ	8919
3.	SMEAJH	9198
	.....	

What is the number of the line on which AJHSME 1989 will appear for the first time?

- (A) 6    (B) 10    (C) 12    (D) 18    (E) 24

23 An artist has 14 cubes, each with an edge of 1 meter. She stands them on the ground to form a sculpture as shown. She then paints the exposed surface of the sculpture. How many square meters does she paint?

- (A) 21    (B) 24    (C) 33    (D) 37    (E) 42

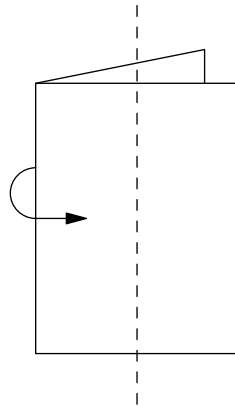


24 Suppose a square piece of paper is folded in half vertically. The folded paper is then cut in half along the dashed line. Three rectangles are formed—a large one and two small ones. What is the ratio of the perimeter of one of the small rectangles to the perimeter of the large rectangle?

- (A)  $\frac{1}{2}$     (B)  $\frac{2}{3}$     (C)  $\frac{3}{4}$     (D)  $\frac{4}{5}$     (E)  $\frac{5}{6}$

USA  
AMC 8  
1989

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25 Every time these two wheels are spun, two numbers are selected by the pointers. What is the probability that the sum of the two selected numbers is even?

- (A)  $\frac{1}{6}$     (B)  $\frac{3}{7}$     (C)  $\frac{1}{2}$     (D)  $\frac{2}{3}$     (E)  $\frac{5}{7}$

