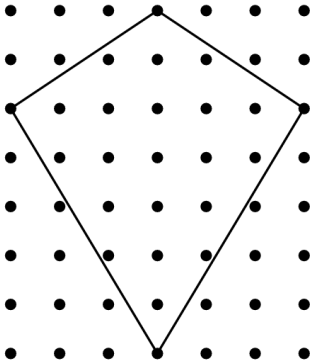
Think Academy

AMC8 Workshop 7

Self-Round

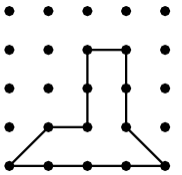
1 （1分）To promote her school's annual Kite Olympics, Genevieve makes a small kite and a large kite for a bulletin board display. The kites look like the one in the diagram below. For her small kite Genevieve draws the kite on a one-inch grid. For the large kite she triples both the height and width of the entire grid.

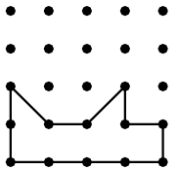
The large kite is covered with gold foil. The foil is cut from a rectangular piece that just covers the entire grid. How many square inches of waste material are cut off from the four corners? （ ）.

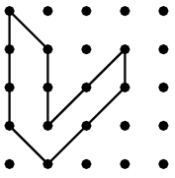


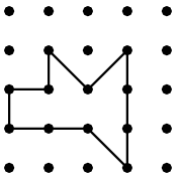
A. 63　　B. 72　　C. 180　　D. 189　　E. 264

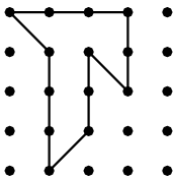
2 （1分）Which of the following polygons has the largest area? （ ）.

A. 

B. 

C. 

D. 

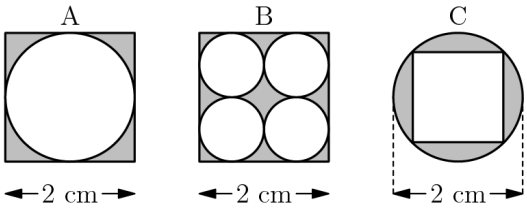
E. 

3 （1分）When a fair six-sided die is tossed on a table top， the bottom face cannot be seen. What is the probability that the product of the numbers on the five faces that can be seen is divisible by 6？（　）.

A. $\frac{1}{3}$　　B. $\frac{1}{2}$　　C. $\frac{2}{3}$　　D. $\frac{5}{6}$

E. 1

4 （1分）The following figures are composed of squares and circles. Which figure has a shaded region with largest area?（　）.



A. A only　　B. B only

C. C only　　D. both A and B

E. all are equal

5 （1分）How many three-digit numbers are divisible by 13?（　）.

A. 7　　B. 67　　C. 69　　D. 76　　E. 77

6 （1分）The average cost of a long-distance call in the USA in 1985 was 41 cents per minute, and the average cost of a long-distance call in the USA in 2005 was 7 cents per minute. Find the approximate percent decrease in the cost per minute of a long-distance call. （　）.

A. 7　　B. 17　　C. 34　　D. 41　　E. 80

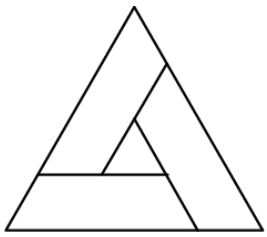
7 （1分）Pick two consecutive positive integers whose sum is less than 100. Square both of those integers and then find the difference of the squares. Which of the following could be the difference? （　）.

A. 2　　B. 64　　C. 79　　D. 96　　E. 131

8 （1分）Susan had 50 dollars to spend at the carnival. She spent 12 dollars on food and twice as much on rides. How many dollars did she have left to spend? （　）.

A. 12　　B. 14　　C. 26　　D. 38　　E. 50

9 In the figure, the outer equilateral triangle has area 16, the inner equilateral triangle has area 1, and the three trapezoids are congruent. What is the area of one of the trapezoids? ( ) .



A. 3 B. 4 C. 5 D. 6 E. 7

In-Class

10 For how many positive integer values of n are both $\frac{n}{3}$ and $3n$ three-digit whole numbers? ( ) .

A. 12 B. 21 C. 27 D. 33 E. 34

11 Two angles of an isosceles triangle measure $70°$ and $x°$. What is the sum of the three possible values of x? ( ) .

A. 95 B. 125 C. 140 D. 165 E. 180

12 In a room, $\frac{2}{5}$ of the people are wearing gloves, and $\frac{3}{4}$ of the people are wearing hats. What is the minimum number of people in the room wearing both a hat and a glove? ( ) .

A. 3 B. 5 C. 8 D. 15 E. 20

13 A jar contains five different colors of gumdrops: 30% are blue, 20% are brown, 15% red, 10% yellow, and the other 30 gumdrops are green. If half of the blue gumdrops are replaced with brown gumdrops, how many gumdrops will be brown? ( ) .

A. 35 B. 36 C. 42 D. 48 E. 64

14 What is the smallest positive integer that is neither prime nor square and that has no prime factor less than 50? ( ) .

A. 3127 B. 3133 C. 3137 D. 3139 E. 3149

15 Eleven members of the Middle School Math Club each paid the same integer amount for a guest speaker to talk about problem solving at their math club meeting. In all, they paid their guest speaker $\$\underline{1A2}$. What is the missing digit A of this 3-digit number? ( ) .

A. 0 B. 1 C. 2 D. 3 E. 4

16 One day the Beverage Barn sold 252 cans of soda to 100 customers, and every customer bought at least one can of soda. What is the maximum possible median number of cans of soda bought per customer on that day? ( ) .

A. 2.5 B. 3.0 C. 3.5 D. 4.0 E. 4.5

17 The Dragonvale Middle School chess team consists of two boys and three girls. A photographer wants to take a picture of the team to appear in the local newspaper. She decides to have them sit in a row with a boy at each end and the three girls in the middle. How many such arrangements are possible? ( ) .

A. 2 B. 4 C. 5 D. 6 E. 12

18 How many positive three-digit integers have a remainder of 2 when divided by 6, a remainder of 5 when divided by 9, and a remainder of 7 when divided by 11? ( ) .

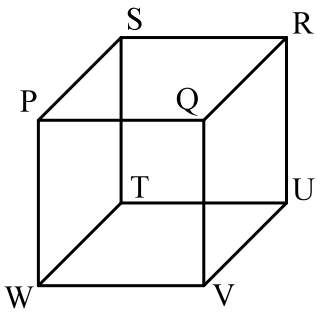
A. 1 B. 2 C. 3 D. 4 E. 5

19 Lola, Lolo, Tiya, and Tiyo participated in a ping pong tournament. Each player competed against each of the other three players exactly twice. Shown below are the win-loss records for the players. The numbers 1 and 0 represent a win or loss, respectively. For example, Lola won five matches and lost the fourth match. What was Tiyo's win-loss record?

Player	Result
Lola	111011
Lolo	101010
Tiya	010100
Tiyo	??????

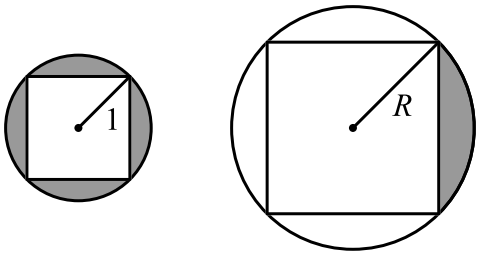
A. 000101 B. 001001 C. 010000 D. 010101 E. 011000

20 Any three vertices of the cube $PQRSTUVW$, shown in the figure below, can be connected to form a triangle. (For example, vertices P, Q, and R can be connected to form isosceles $\triangle PQR$.) How many of these triangles are equilateral and contain P as a vertex?



A. 0 B. 1 C. 2 D. 3 E. 6

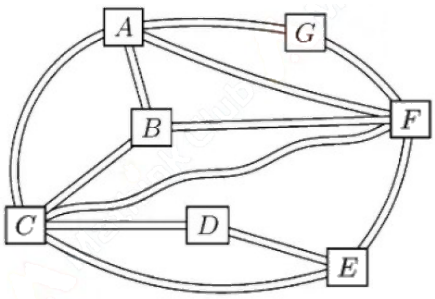
21 The circle shown below on the left has a radius of 1 unit. The region between the circle and the inscribed square is shaded. In the circle shown on the right, one quarter of the region between the circle and the inscribed square is shaded. The shaded regions in the two circles have the same area. What is the radius R, in units, of the circle on the right?



A. $\sqrt{2}$ B. 2 C. $2\sqrt{2}$ D. 4

E. $4\sqrt{2}$

22 The Konigsberg School has assigned grades 1 through 7 to pods A through G, one grade per pod. Some of the pods are connected by walkways, as shown in the figure below. The school noticed that each pair of connected pods has been assigned grades differing by 2 or more grade levels. (For example, grades 1 and 2 will not be in pods directly connected by a walkway.) What is the sum of the grade levels assigned to pods C, E, and F?



A. 12 B. 13 C. 14 D. 15 E. 16