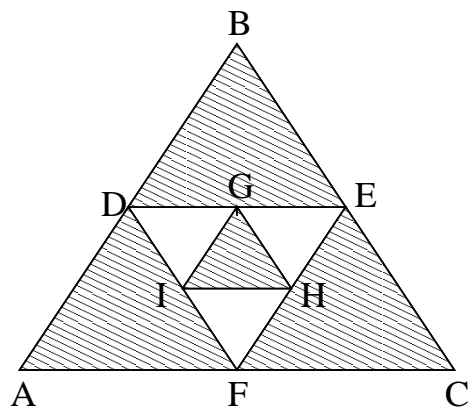


AB EXAM

1. Points **D**, **E** and **F** are the midpoints of the sides of an equilateral triangle **ABC**. Points **G**, **H** and **I** are the midpoints of the sides of triangle **DEF**. What fraction of the total area is shaded?



2. List the numbers 2^{100} , 3^{75} and 5^{50} in order from smallest to largest.

3. These hockey teams have played each other once.

TEAM	GAMES PLAYED	WON	LOST	TIED	GOALS FOR	GOALS AGAINST
Montreal	3	3	0	0	7	1
Boston	3	1	1	1	2	3
Toronto	3	1	1	1	3	3
New York	3	0	3	0	1	6

If Montreal defeated Boston 3-0, what was the score of the game between Toronto and Boston?

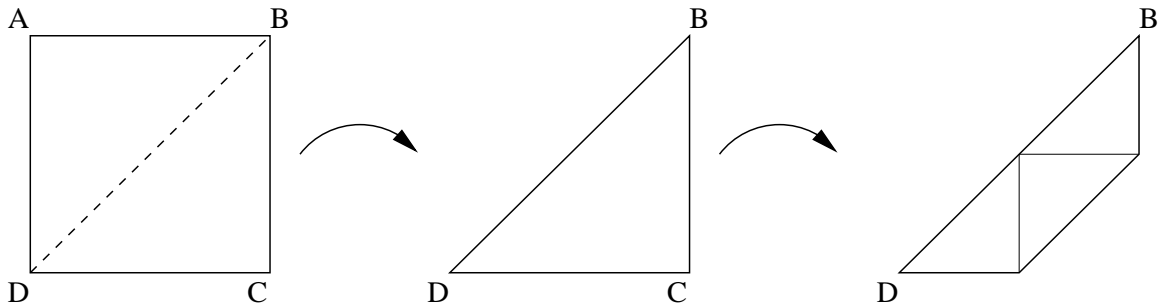
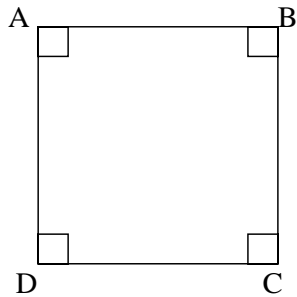
4. Among 100 applicants for a technical position, 10 had never taken a course in chemistry or physics, 75 had taken at least one chemistry course, and 83 had taken at least one physics course. How many had taken both a chemistry and a physics course?

5. The sum of three different prime numbers is 40. Find the product of the largest two of the three prime numbers.

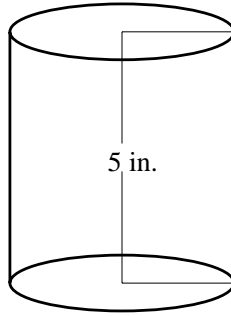
6. Paul shared his baseball cards with three friends. He gave half his cards to one friend, one-third of the cards that were left to a second friend, and the remaining 12 cards to a third friend. How many cards did Paul have at the beginning?

7. Find the remainder when $8 \cdot 10^{18} + 1^{18}$ is divided by 9.

8. The square piece of paper shown is folded over so that vertex **A** lies on vertex **C**. The paper is folded again so that vertex **C** lies on the midpoint of **DB**. Given that the length of one side of the square is 8 cm, find the area of the resulting figure.



9. A can is in the shape of a right circular cylinder. The circumference of the base of the can is 12 inches, and the height of the can is 5 inches. A spiral stripe is painted on the can in such a way that it winds around the can exactly once as it reaches from the bottom of the can to the top. It reaches the top of the can directly above the spot where it left the bottom. What is the length, in inches, of the stripe?



10. Find $a + b$ if

$$\sqrt{\frac{3}{2} \cdot \frac{4}{3} \cdot \frac{5}{4} \cdot \frac{6}{5} \cdots \frac{a}{b}} = 3$$

11. What is the largest positive integer that must be a factor of

$$(n - 2)(n - 1)(n)(n + 1)(n + 2)$$

for all positive integers n ?

12. Find the mean of all even numbers that can be formed using exactly three of the digits 2, 3, 5 and 7.

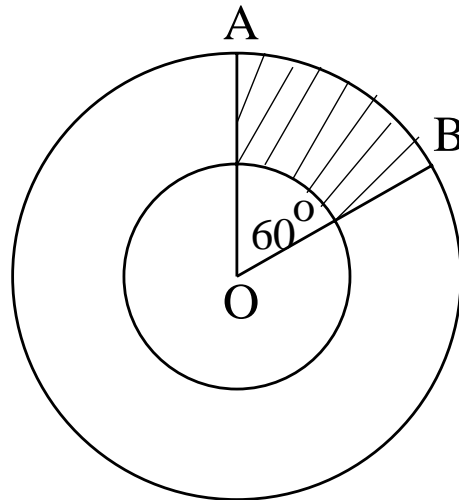
13. A basketball player is on the line to shoot a one-and-one free throw. (In a one-and-one situation, a second shot is allowed only if the first shot is successful.) If the player's free throw shooting average is .750, what is the probability that he will score exactly one basket? Express your answer as a common fraction.

14. In the product shown below, the letters Q and S represent different digits. Find the sum Q+S.

$$\begin{array}{r} 2Q \\ \times S2 \\ \hline \overline{1404} \end{array}$$

15. If $3 + 7 + 11 + \cdots + 87 = 15k$, find k .

16. Point **O** is the center of the two circles in the diagram, the measure of angle **AOB** is 60 degrees, and the length of the radius of the larger circle is twice the length of the radius of the smaller one. If the area of the shaded region is $(9/8)\pi$ square units, what is the number of square units in the area of the smaller circle? Express the answer in terms of π .



17. Find the area of the trapezoid bounded by the graphs of the equations $x = 6$, $y = 4$, $y = \frac{1}{2}x$ and the y -axis.