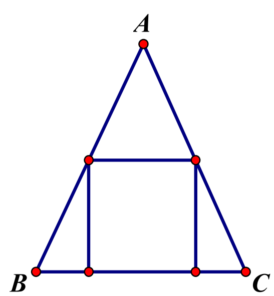
1. Two bags each contain a combination of red and blue discs. In bag A, exactly $\frac{2}{9}$ of the discs are red.In bag B, exactly $\frac{3}{11}$ of the discs are red. Both bags contain exactly the same number of red discs. If the contents of bag A and bag B are emptied into a larger bag C (which contains no other discs) ,what fraction of the discs in bag C will be red

2. A square is inscribed in the triangle ABC with one edge on the line BC, one vertex on AB and one vertex on AC as in the diagram. Find the length of a side of the square if
AB = AC = 13 and BC = 10.



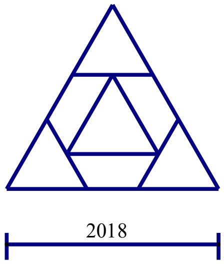
3. Jenny has 6 wooden blocks; 2 red, 2 green and 2 blue. She is to place them in a row so that two consecutive blocks are never the same color. How many rows of 6 blocks can she form?

4. Obtuse triangle ABC has AB = 4, BC = 6 and CA = 8. What is the length of the altitude from A to side BC?

5. Find the largest integer x such that $\sqrt{x}$ and $\sqrt{x+88}$ are both integers.

6. Vicente rides his bike at a constant speed from his house to the city courthouse, which is exactly 6 miles away. When he reaches the courthouse, he immediately turns around and rides home at a constant speed 40% slower than his previous speed. At the moment exactly halfway between the time Vicente leaves home and the time he returns home, how far (in miles) is he from the courthouse?

7. The picture below shows an equilateral triangle whose sides have length 2018. In each corner of the triangle a smaller equilateral triangle with sides of length 840 is inscribed. The midpoints of the inner sides of these three smaller triangles are joined to form an equilateral triangle in the center of the large equilateral triangle. What is the side length of this new equilateral triangle?



8. Find the number of possible solutions to $a + b + c = 33$, if a, b and c are positive integers with $a \geq b \geq c$.

9. A sequence of integers 1, 3, 5, 11, 21, ... is formed by applying the following rules:
The first term is 1. To obtain term (k+1) , multiply the term k by 2, then add one if k is odd and subtract 1 if k is even. What are the last two digits of the term 2018?

10. The integers 1 through 999 are written in a list. Find the sum of all the digits used.

11.   Circle O has a radius of 5 units. Points A and B are points on the circle and AB = 8 units. Circle C is tangent to AB at a point 1 unit from A. It is also tangent to circle O. The centers of O and C are on opposite sides of AB. What is the radius of circle C?

12. Samantha fills each square in the equation □□□ + □□□ = □□□ with one of the digits 1 through 9, using each digit exactly once, to make a correct addition fact. What is the greatest possible value of the three-digit number on the right of the equals sign?

13. Lisa has a username LISA1234567 for her school account, and wants to make up a password using all the 11 symbols of her username exactly once, but with no two of the four letters adjacent. How many passwords does she have to choose from?

14. A rectangular region is covered by square 1 ft x1 ft tiles. Exactly half of the tiles are on the perimeter of the region. Let A be the area of the largest rectangular region of positive area for which this is possible, and B be the area of the smallest such region of positive area. Find A-B.

15. Triangle ABC has AB = 5 units, BC = 6 units and CA = 7 units. Point M is the midpoint of BC. The bisector of angle ABC intersects AM at Q. What is the length of QM?