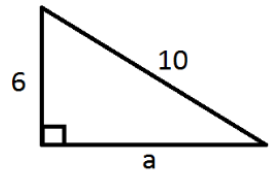
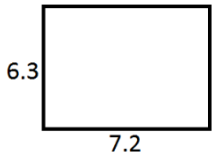
Knights of Pi Math Tournament – Jan. 7, 2017

Individual Test 7th/8th

1	Evaluate: $1331 \div 11$
2	If $5x + 2 = 11x - 34$, what does x equal?
3	What is the probability of flipping three heads in a row with a fair coin?
4	What is the area of a circle with a circumference of 8π?
5	Andy ate half of the jelly beans in a bag. Betty ate 7 more. 5 jelly beans remain. How many jelly beans were originally in the bag?
6	Evaluate: $\sqrt{2 \times 72}$
7	What is the length of side a? 
8	Charlie flips a coin 5 times. What is the probability that he gets heads every time?
9	How many positive prime numbers under 30 are there?
10	What is the sum of the number of edges in a heptagon and the number of diagonals in a pentagon?
11	What angle (in degrees) is complementary to 63˚?
12	Diana scored an average of 92 points over 5 tests worth 100 points each. If he aced the first 4 tests, what did he score on the 5th test?
13	Evaluate: $(282 - 84)/2$
14	How many ways are there to arrange the letters “K”, “P”, “M”, and “T”?
15	How many positive 4 digit numbers are there less than 2000?
16	What is the area of the largest triangle that can fit in this rectangle? 

17	Eric, Frank, Grace, Harry, and Iris are standing in a line. Grace is not last, and is directly behind Eric. Frank is behind Iris, who is 2nd in line. Which position is Harry in?
18	What is the remainder of $72339/8$?
19	A product worth $39.99 is on sale. Jason bought it for $31.99 (disregard sales tax). Complete the statement: the product had a sale of ___% off. (Round to nearest %)
20	Kelly drove at 30 mph for 10 minutes and at 60 mph for 20 minutes to get home from work. How far did she drive?
21	If $a\#b = (a+b)(a-b)$, what is $(4\#2)\#6$?
22	Lucas invested 2000 dollars at an interest rate of 6% compounded annually. How many years will it take for Lucas's investment to triple? (Round to nearest year)
23	Michael and Nancy start running from the same place on a 400m track. They run in opposite directions. Michael jogs at 3 m/s while Nancy sprints at 5 m/s. How much time in seconds does it take for them to meet on the other side of the track?
24	How many rectangles of any size are in this image? 
25	What is 2016 base ten expressed as in base 6?
26	How many three-digit whole numbers use only odd numbers with no digits repeating?
27	If 2 apples are worth 3 bananas, and 2 bananas are worth 9 carrots, how many carrots are worth 4 apples?
28	What are the zeroes of $y = x^3 - 2x^2 - x + 2$?
29	What is the sum of the first 34 odd integers greater than 11?
30	Given the following, what is the value of $a+b+c$? $a+b=7$ $b+c=3$ $a+c=38$
31	What is the area of a triangle with side lengths 17, 21, and 10?
32	ASCII is used to represent text in computers. In ASCII, uppercase "A" is equal to 65 and lowercase "a" is equal to 97. What is the difference between the two, expressed in binary?
33	If $x+y=8$ and $x \times y = 15$, with x greater than y, what is the distance between the two points (x,y) and (y,x)? (Express your answer in simplest radical form)

34	Kevin is eating a two-scoop ice cream cone. The available flavors are chocolate, vanilla, and edamame. He likes it if it has at least one scoop of either chocolate or edamame, but not both. If the scoops of his ice cream are randomly selected, what is the probability that he will like it?
35	What is the length of the semimajor axis of an ellipse with the following equation: $$\frac{x^2}{9}+\frac{y^2}{4}=1$$
36	What is the value of the convergent series $\frac{1}{2^n}$ starting from n = 1?
37	If a wheel with a radius of 6 inches rotates 600 times per minute, what is the linear velocity of the wheel in feet per hour? (Express your answer in terms of π)
38	Evaluate: $(\log_2 9)(\log_3 7)(\log_7 8)$
39	A square on a coordinate plane has vertices at the points (0, 4), (4, 0), (0, -4), and (-4, 0). The entire square is rotated 45 degrees clockwise about the origin. What is the sum of the absolute value of all the new coordinates of the new vertices of the square? (Express your answer in simplest radical form.)
40	Express the negadecimal (base -10) number 2017 as an integer in base -8.

