TestYourself#30Answer

The diameter of the circumcircle can be found from the sides of the triangle by the formula:
2abc/sqrt((a+b+c)(-a+b+c)(a-b+c)(a+b-c)), where a,b and c are the sides of the triangle.
There are 6x6x6 = 216 combinations of the integers 1 to 6 taken three at a time, to wit:

1-1-1	2-1-1	3-1-1	4-1-1	5-1-1	6-1-1		160 can be eliminated as duplicates
1-1-2	2-1-2	3-1-2	4-1-2	5-1-2	6-1-2		leaving 56 combinations
1-1-3	2-1-3	3-1-3	4-1-3	5-1-3	6-1-3		
1-1-4	2-1-4	3-1-4	4-1-4	5-1-4	6-1-4		21 can be eliminated as impossible triangles
1-1-5	2-1-5	3-1-5	4-1-5	5-1-5	6-1-5		(2 sides equal or less than the third side)
1-1-6	2-1-6	3-1-6	4-1-6	5-1-6	6-1-6		
1-2-1	2-2-1	3-2-1	4-2-1	5-2-1	6-2-1		
1-2-2	2-2-2	3-2-2	4-2-2	5-2-2	6-2-2		All 6 equilateral triangles can be eliminated
1-2-3	2-2-3	3-2-3	4-2-3	5-2-3	6-2-3		(Only a 5.4'± fits)
1-2-4	2-2-4	3-2-4	4-2-4	5-2-4	6-2-4		
1-2-5	2-2-5	3-2-5	4-2-5	5-2-5	6-2-5		
1-2-6	2-2-6	3-2-6	4-2-6	5-2-6	6-2-6		
1-3-1	2-3-1	3-3-1	4-3-1	5-3-1	6-3-1		Using two of the longest possible sides, 6 & 6, requires
1-3-2	2-3-2	3-3-2	4-3-2	5-3-2	6-3-2		a minimum 3rd side of 3.4', thereby eliminating the
1-3-3	2-3-3	3-3-3	4-3-3	5-3-3	6-3-3		22 combinations remaining with a side less than 3 and
1-3-4	2-3-4	3-3-4	4-3-4	5-3-4	6-3-4		the 2 greater than/equal to 4 when paired with 6 & 6
1-3-5	2-3-5	3-3-5	4-3-5	5-3-5	6-3-5		
1-3-6	2-3-6	3-3-6	4-3-6	5-3-6	6-3-6		
1-4-1	2-4-1	3-4-1	4-4-1	5-4-1	6-4-1		
1-4-2	2-4-2	3-4-2	4-4-2	5-4-2	6-4-2		
1-4-3	2-4-3	3-4-3	4-4-3	5-4-3	6-4-3		
1-4-4	2-4-4	3-4-4	4-4-4	5-4-4	6-4-4		
1-4-5	2-4-5	3-4-5	4-4-5	5-4-5	6-4-5		The 5 combinations left are computed below
1-4-6	2-4-6	3-4-6	4-4-6	5-4-6	6-4-6		showing 5-5-6 to be the correct sides of the triangle
1-5-1	2-5-1	3-5-1	4-5-1	5-5-1	6-5-1		
1-5-2	2-5-2	3-5-2	4-5-2	5-5-2	6-5-2		
1-5-3	2-5-3	3-5-3	4-5-3	5-5-3	6-5-3		
1-5-4	2-5-4	3-5-4	4-5-4	5-5-4	6-5-4		
1-5-5	2-5-5	3-5-5	4-5-5	5-5-5	6-5-5		
1-5-6	2-5-6	3-5-6	4-5-6	5-5-6	6-5-6		
1-6-1	2-6-1	3-6-1	4-6-2	5-6-1	6-6-1		
1-6-2	2-6-2	3-6-2	4-6-2	5-6-2	6-6-2		
1-6-3	2-6-3	3-6-3	4-6-3	5-6-3	6-6-3		
1-6-4	2-6-4	3-6-4	4-6-4	5-6-4	6-6-4		
1-6-5	2-6-5	3-6-5	4-6-5	5-6-5	6-6-5		
1-6-6	2-6-6	3-6-6	4-6-6	5-6-6	6-6-6		

a	b	c	2abc	a+b+c	-a+b+c	a-b+c	a+b-c	sqrt(product)	2abc/sqrt
4	4	5	160	13	5	5	3	31.22498999	5.124101
4	4	6	192	14	6	6	2	31.74901573	6.047432
4	5	5	200	14	6	4	4	36.66060556	5.455447
4	5	6	240	15	7	5	3	39.68626967	6.047432
5	5	6	300	16	6	6	4	48.00000000	6.250000