## 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:

	2-1-1	3-1-1	4-1-1	5-1-1	6-1-1			be eliminated a	
1-1-2	2-1-2	3-1-2	4-1-2	5-1-2	6-1-2		leaving 5	66 combinations	3
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 b	e 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 th	an 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 equ	ilateral triangle	s can be eliminated
1-2-3	2-2-3	3-2-3	4-2-3	5-2-3	6-2-3		(Only a s		
	2-2-4	3-2-4	4-2-4	5-2-4	6-2-4			,	
	2-2-5	3-2-5	4-2-5	5-2-5	6-2-5				
	2-2-6	3-2-6	4-2-6	5-2-6	6-2-6				
	2-3-1	3-3-1	4-3-1	5-3-1	6-3-1		Using tw	o of the longes	t possible sides, 6 & 6, requires
	2-3-2	3-3-2	4-3-2	5-3-2	6-3-2		_	•	3.4', thereby eliminating the
	2-3-3	3-3-3	4-3-3	5-3-3	6-3-3				ning with a side less than 3 and
	2-3-4	3-3-4	4-3-4	5-3-4	6-3-4				to 4 when paired with 6 & 6
		3-3-5	4-3-5	5-3-5	6-3-5		o _ g. c		to i mion panoa min o a o
	2-3-6	3-3-6	4-3-6	5-3-6	6-3-6				
1-4-1		3-4-1	4-4-1	5-4-1	6-4-1				
	2-4-2		4-4-2	5-4-2	6-4-2				
1-4-3		3-4-3	4-4-3	5-4-3	6-4-3				
1-4-4		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 co	mbinations left	are computed below
1-4-5 1-4-6	2-4-5 2-4-6	3-4-5 3-4-6	4-4-5 4-4-6	5-4-5 5-4-6	6-4-5 6-4-6				are computed below correct sides of the triangle
1-4-6	2-4-6	3-4-6	4-4-6	5-4-6	6-4-6				are computed below correct sides of the triangle
1-4-6 1-5-1	2-4-6 2-5-1	3-4-6 3-5-1	4-4-6 4-5-1	5-4-6 5-5-1	6-4-6 6-5-1				
1-4-6 1-5-1 1-5-2	2-4-6 2-5-1 2-5-2	3-4-6 3-5-1 3-5-2	4-4-6 4-5-1 4-5-2	5-4-6 5-5-1 5-5-2	6-4-6 6-5-1 6-5-2				
1-4-6 1-5-1 1-5-2 1-5-3	2-4-6 2-5-1 2-5-2 2-5-3	3-4-6 3-5-1 3-5-2 3-5-3	4-4-6 4-5-1 4-5-2 4-5-3	5-4-6 5-5-1 5-5-2 5-5-3	6-4-6 6-5-1 6-5-2 6-5-3				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-5-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-5-6	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-5-6 1-6-1	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-5-6 4-6-2	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-5-6 1-6-1 1-6-2	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1 3-6-2	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-5-6 4-6-2 4-6-2	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-5-6 1-6-1 1-6-2 1-6-3	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1 3-6-2 3-6-3	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-5-6 4-6-2 4-6-2 4-6-3	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-5-6 1-6-1 1-6-2 1-6-3 1-6-4	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1 3-6-2 3-6-3 3-6-4	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-5-6 4-6-2 4-6-2 4-6-3 4-6-4	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4				
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5	a-b+c	showing		correct sides of the triangle
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5 1-6-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5 2-6-6 b	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5 3-6-6	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5 6-6-6		showing a+b-c	5-5-6 to be the sqrt(product)	correct sides of the triangle  2abc/sqrt
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5 1-6-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5 2-6-6 b	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5 3-6-6	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6 2abc	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6 a+b+c	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5 6-6-6	5	showing a+b-c 3	5-5-6 to be the sqrt(product) 31.22498999	2abc/sqrt 5.124101
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5 1-6-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5 2-6-6 b	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5 3-6-6	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6 2abc 160 192	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6 a+b+c	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5 6-6-6	5 6	a+b-c 3 2	5-5-6 to be the sqrt(product) 31.22498999 31.74901573	2abc/sqrt 5.124101 6.047432
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5 1-6-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5 2-6-6 b	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5 3-6-6 c	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6 2abc 160 192 200	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6 a+b+c	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5 6-6-6	5 6 4	a+b-c 3 2 4	5-5-6 to be the sqrt(product) 31.22498999 31.74901573 36.66060556	2abc/sqrt 5.124101 6.047432 5.455447
1-4-6 1-5-1 1-5-2 1-5-3 1-5-4 1-5-5 1-6-1 1-6-2 1-6-3 1-6-4 1-6-5 1-6-6	2-4-6 2-5-1 2-5-2 2-5-3 2-5-4 2-5-5 2-5-6 2-6-1 2-6-2 2-6-3 2-6-4 2-6-5 2-6-6 b	3-4-6 3-5-1 3-5-2 3-5-3 3-5-4 3-5-5 3-5-6 3-6-1 3-6-2 3-6-3 3-6-4 3-6-5 3-6-6	4-4-6 4-5-1 4-5-2 4-5-3 4-5-4 4-5-5 4-6-2 4-6-2 4-6-3 4-6-4 4-6-5 4-6-6 2abc 160 192	5-4-6 5-5-1 5-5-2 5-5-3 5-5-4 5-5-5 5-5-6 5-6-1 5-6-2 5-6-3 5-6-4 5-6-5 5-6-6 a+b+c	6-4-6 6-5-1 6-5-2 6-5-3 6-5-4 6-5-5 6-5-6 6-6-1 6-6-2 6-6-3 6-6-4 6-6-5 6-6-6	5 6	a+b-c 3 2	5-5-6 to be the sqrt(product) 31.22498999 31.74901573	2abc/sqrt 5.124101 6.047432 5.455447 6.047432