高愛迪斯 第三十八期【中年級數學題目】1041002

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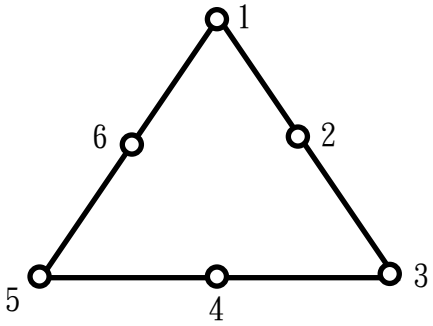
三角形是一種最基本的幾何圖形，而在日常生活中也隨處都可以發現三角形的蹤跡，所以值得我們好好的做一番研究。

【問題一】1★

如下圖所示，在一個正三角形的邊及頂點上共有 6 個點，請問用這 6 個點中的任意三個點，可以畫出多少個三角形？請一一寫出

例如：(1-2-4)可畫出，(1-2-3)則無法畫出，(2-3-4)與(3-4-2)相同只能算一個



~~(1-2-3)~~ *

(1-2-4) (1-3-4)

(1-2-5) (1-3-5) (1-4-5)

(1-2-6) (1-3-6) (1-4-6) ~~(1-5-6)~~ *

(2-3-4)

(2-3-5) (2-4-5)

(2-3-6) (2-4-6) (2-5-6)

~~(3-4-5)~~ *

(3-4-6) (3-5-6)

(4-5-6)

＝4*1 + 3*2 + 2*3 + 1*4 - 3 （三邊三點直線）

＝ 4+6+6+4-3

=17

* 三點連成直線扣除

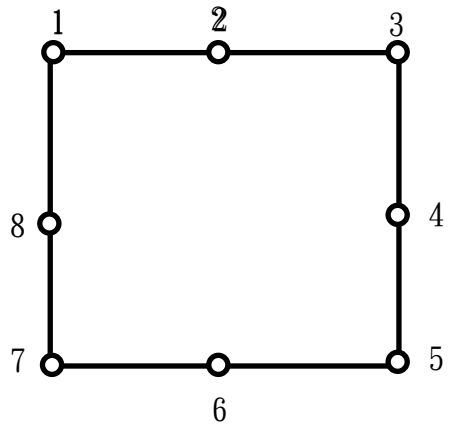
1 答：共可畫出 17 個三角形

分別是：

(1-2-4)	(2-3-4)	(3-4-6)	(4-5-6)
(1-2-5)	(2-3-5)	(3-5-6)	
(1-2-6)	(2-3-6)		
(1-3-4)	(2-4-5)		
(1-3-5)	(2-4-6)		
(1-3-6)	(2-5-6)		
(1-4-5)			
(1-4-6)			

【問題二】2★

如下圖所示，在一個正正方形的邊及頂點上共有 8 個點，請問用這 8 個點中的任意三個點，可以畫出多少個三角形?(52)個。請一一寫出



~~(1-2-3)~~

(1-2-4) (1-3-4)

(1-2-5) (1-3-5) (1-4-5)

(1-2-6) (1-3-6) (1-4-6) (1-5-6)

(1-2-7) (1-3-7) (1-4-7) (1-5-7) (1-6-7)

(1-2-8) (1-3-8) (1-4-8) (1-5-8) (1-6-8) ~~(1-7-8)~~

(2-3-4)

(2-3-5) (2-4-5)

(2-3-6) (2-4-6) (2-5-6)

(2-3-7) (2-4-7) (2-5-7) (2-6-7)

(2-3-8) (2-4-8) (2-5-8) (2-6-8) (2-7-8)

~~(3-4-5)~~

(3-4-6) (3-5-6)

(3-4-7) (3-5-7) (3-6-7)

(3-4-8) (3-5-8) (3-6-8) (3-7-8)

(4-5-6)

(4-5-7) (4-6-7)

(4-5-8) (4-6-8) (4-7-8)

~~(5-6-7)~~

(5-6-8) (5-7-8)

(6-7-8)

= 6*1 + 5*2 + 4*3 + 3*4 + 2*5 + 1*6 -4 （四邊三點直線）

＝　6+10+12+12+10+6-4

＝ 52

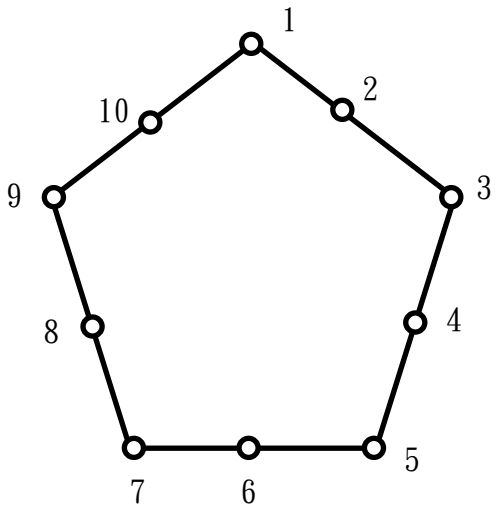
2. 答：52 個三角形

分別是

(1-2-4)	(2-3-4)	(3-4-6)	(4-5-6)	(5-6-8)	(6-7-8)
(1-2-5)	(2-3-5)	(3-4-7)	(4-5-7)	(5-7-8)	
(1-2-6)	(2-3-6)	(3-4-8)	(4-5-8)		
(1-2-7)	(2-3-7)	(3-5-6)	(4-6-7)		
(1-2-8)	(2-3-8)	(3-5-7)	(4-6-8)		
(1-3-4)	(2-4-5)	(3-5-8)	(4-7-8)		
(1-3-5)	(2-4-6)	(3-6-7)			
(1-3-6)	(2-4-7)	(3-6-8)			
(1-3-7)	(2-4-8)	(3-7-8)			
(1-3-8)	(2-5-6)				
(1-4-5)	(2-5-7)				
(1-4-6)	(2-6-8)				
(1-4-7)	(2-6-7)				
(1-4-8)	(2-6-8)				
(1-5-6)	(2-7-8)				
(1-5-7)					
(1-5-8)					
(1-6-7)					
(1-6-8)					

【問題三】3★

如下圖所示，在一個正五角形的邊及頂點上共有 10 個點，請問用這 10 個點中的任意三個點，可以畫出多少個三角形?(115)個。請一一寫出



~~1-2-3~~

1-2-4 1-3-4

1-2-5 1-3-5 1-4-5

1-2-6 1-3-6 1-4-6 1-5-6

1-2-7 1-3-7 1-4-7 1-5-7 1-6-7

1-2-8 1-3-8 1-4-8 1-5-8 1-6-8 1-7-8

1-2-9 1-3-9 1-4-9 1-5-9 1-6-9 1-7-9 1-8-9

1-2-10 1-3-10 1-4-10 1-5-10 1-6-10 1-7-10 1-8-10 ~~1-9-10~~

2-3-4

2-3-5 2-4-5

2-3-6 2-4-6 2-5-6

2-3-7 2-4-7 2-5-7 2-6-7

2-3-8 2-4-8 2-5-8 2-6-8 2-7-8

2-3-9 2-4-9 2-5-9 2-6-9 2-7-9 2-8-9

2-3-10 2-4-10 2-5-10 2-6-10 2-7-10 2-8-10 2-9-10

~~3-4-5~~

3-4-6 3-5-6

3-4-7 3-5-7 3-6-7

3-4-8 3-5-8 3-6-8 3-7-8

3-4-9 3-5-9 3-6-9 3-7-9 3-8-9

3-4-10 3-5-10 3-6-10 3-7-10 3-8-10 3-9-10

4-5-6

4-5-7 4-6-7

4-5-8 4-6-8 4-7-8

4-5-9 4-6-9 4-7-9 4-8-9

4-5-10 4-6-10 4-7-10 4-8-10 4-9-10

~~5-6-7~~

5-6-8 5-7-8

5-6-9 5-7-9 5-8-9

5-6-10 5-7-10 5-8-10 5-9-10

6-7-8

6-7-9 6-8-9

6-7-10 6-8-10 6-9-10

~~7-8-9~~

7-8-10 7-9-10

= 8*1 + 7*2 + 6*3 + 5*4 + 4*5 + 3*6 + 2*7 + 1*8- 5（五邊三點直線）

=8+14+18+20+20+18+14+8-5

=115

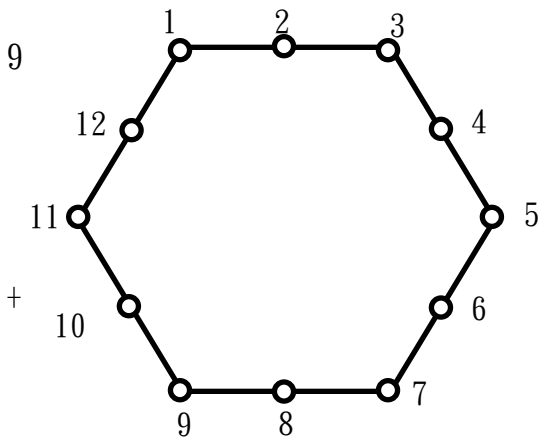
3. 答:115 個三角形

分別是

(1-2-4)	(2-3-4)	(3-4-6)	(4-5-6)	(5-6-8)	(6-7-8)	(7-8-10)
(1-2-5)	(2-3-5)	(3-4-7)	(4-5-7)	(5-6-9)	(6-7-9)	(7-9-10)
(1-2-6)	(2-3-6)	(3-4-8)	(4-5-8)	(5-6-10)	(6-7-10)	(8-9-10)
(1-2=7)	(2-3-7)	(3-4-9)	(4-5-9)	(5-7-8)	(6-8-9)	
(1-2-8)	(2-3-8)	(3-4-10)	(4-5-10)	(5-7-9)	(6-8-10)	
(1-2-9)	(2-3-9)	(3-5-6)	(4-6-7)	(5-7-10)	(6-9-10)	
(1-2-10)	(2-3-10)	(3-5-7)	(4-6-8)	(5-8-9)		
(1-3-4)	(2-4-5)	(3-5-8)	(4-6-9)	(5-8-10)		
(1-3-5)	(2-4-6)	(3-5-9)	(4-6-10)	(5-9-10)		
(1-3-6)	(2-4-7)	(3-5-10)	(4-7-8)			
(1-3-7)	(2-4-8)	(3-6-7)	(4-7-9)			
(1-3-8)	(2-4-9)	(3-6-8)	(4-7-10)			
(1-3-9)	(2-4-10)	(3-6-9)	(4-8-9)			
(1-3-10)	(2-5-6)	(3-6-10)	(4-8-10)			
(1-4-5)	(2-5-7)	(3-7-8)	(4-9-10)			
(1-4-6)	(2-5-8)	(3-7-9)				
(1-4-7)	(2-5-9)	(3-7-10)				
(1-4-8)	(2-5-10)	(3-8-9)				
(1-4-9)	(2-6-7)	(3-8-10)				
(1-4-10)	(2-6-8)	(3-9-10)				
(1-5-6)	(2-6-9)					
(1-5-7)	(2-6-10)					
(1-5-8)	(2-7-8)					
(1-5-9)	(2-7-9)					
(1-5-10)	(2-7-10)					
(1-6-7)	(2-8-9)					
(1-6-8)	(2-8-10)					
(1-6-9)	(2-9-10)					
(1-6-10)						
(1-7-8)						
(1-7-9)						
(1-7-10)						
(1-8-9)						
(1-8-10)						

【問題四】4★

如下圖所示，在一個正六角形的邊及頂點上共有 12 個點，請問用這 12 個點中的任意三個點，可以畫出多少個三角形?(214)個。請寫出計算方式，不用一一寫出。



(12-2)*1+9*2+8*3+7*4+6*5+5*6+4*7+3*8+2*9+1*10-6=214

截止日期：104 年 12 月 11 日(星期五)下午 4：00