

# 2021/22 第十六屆香港小學數學創意解難比賽

18/6/2022 (星期六) 10:25-11:30

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## 比賽時間：65 分鐘

參賽者須知：

1. 比賽時間：65 分鐘。建議在甲部用 50 分鐘作答，在乙部用 15 分鐘作答。
2. 本問題卷共 10 頁，甲部有 13 題數學題，乙部有 1 題創意解難題。另外答題紙共 8 頁。
3. 每位參賽學生獲派一份問題卷及一份答題紙。
4. 比賽其間隊員可以討論題目，並於答題紙寫上議定的答案。  
**\*\* 只有寫於隊長的答題紙上的答案方可得到評分。**
5. 參賽隊伍需自備文具及計算機。為公平起見，比賽中只可使用非圖像計算機。本比賽中嚴禁使用電子字典、電腦、電話或其他有上網或通訊功能的工具。
6. 本試卷每頁的空白位置可作為草稿之用。每位參賽學生會獲派一張草稿紙，如有需要，可要求額外草稿紙。
7. 在筆試完結後，必須交回隊長的答題紙。

# 2021/22 The 16<sup>th</sup> Hong Kong Mathematics Creative Problem Solving Competition for Primary Schools

18/6/2022 (Saturday) 10:25-11:30

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**Time allowed : 65 minutes**

Instructions for participants :

1. **Time allowed: 65 minutes.** It is advised to spend 50 minutes in Section A and 15 minutes in Section B.
2. The question paper consists of 10 pages. There are 13 questions in Section A and 1 creative problem in Section B. It follows by 8 pages of answer sheets.
3. Each participant will get a set of question paper and a set of answer sheets.
4. Team members are allowed to discuss during the competition. The agreed answers should be written on the answer sheets.  
**\*\* Only the answers in the captain's answer sheet will be marked.**
5. Participating teams should bring their own stationery and calculators. For the purpose of fairness, please use only non-graphic calculators. Electronic dictionaries, computers, mobile phones and other online or communication devices are prohibited.
6. The blank space on each page of this question paper can be used for rough work. Each participant will get one rough work sheet. Extra rough work sheets will be provided upon request.
7. The captain's answer sheets will be collected after the competition.

甲部 (建議此部用 50 分鐘作答)

**Section A (Suggested to use 50 minutes in this Section)**

1. 六年級最少要有多少個學生，才能確保有 20 個學生在相同的月份生日？

At least how many primary six students are there in order to have 20 of them born in the same month?

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2. 從 3、4、5、14、28、29 和 43 中選出 3 個不同的數，它們的和是奇數的方法共有多少個？

If three different numbers are selected among the integers 3, 4, 5, 14, 28, 29 and 43, how many of the combinations have the sum being odd numbers?

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3. 用 5 元和 10 元硬幣換 50 元紙幣的方法能有多少種？

How many ways can a \$50 note be exchanged using \$5 and \$10 coins only?

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4. 小明順序寫出 1 至 100，他共寫了數字「9」多少次？  
Billy writes down 1 to 100 in ascending order, how many digit '9' does he write?
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5. 有 40 位學生，當中有 30 人是田徑隊，20 人是游泳隊。  
There are 40 students. 30 of whom join the athletics team and 20 of whom join the swimming team.
- a) 最少有多少位學生可能同時是田徑隊和游泳隊？  
**At least** how many students are members of both athletics team and swimming team?
- b) 最多有多少位學生可能同時是田徑隊和游泳隊？  
**At most** how many students are members of both athletics team and swimming team?
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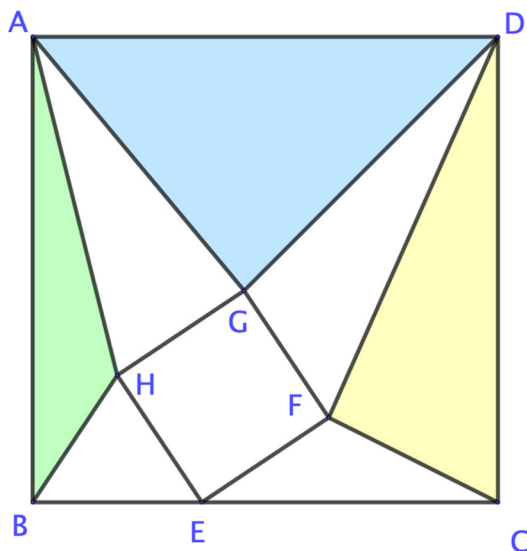
6. 在下式的方格內填上一個正分數或正整數，使得算式的結果化至最簡後是一個分母為 5 的真分數。

Fill in a positive fraction or positive integer in the box of the expression below to make the result of the expression, in simplest form, a fraction with denominator equal to 5.

$$\frac{\frac{24}{1001}}{\frac{13}{77} - \boxed{\phantom{000}}}$$

7. 圖中  $ABCD$  和  $EFGH$  都是正方形。已知  $E$  點在線段  $BC$  上。如果  $\triangle ABH$  和  $\triangle DAG$  的面積分別是  $11 \text{ cm}^2$  和  $33 \text{ cm}^2$ ，求  $\triangle CDF$  的面積。

In the figure,  $ABCD$  and  $EFGH$  are squares. Given that  $E$  is a point on  $BC$ . If the area of  $\triangle ABH$  and  $\triangle DAG$  are  $11 \text{ cm}^2$  and  $33 \text{ cm}^2$  respectively, find the area of  $\triangle CDF$ .



8. 小強與小聰在一條 100 公里的賽道上同時開始跑步，小強以每小時 3 公里的速度由起點跑到終點，小聰則以每小時 5 公里的速度由終點跑至起點。小強每跑 6 公里便休息 30 分鐘，而小聰每跑 5 公里便休息 15 分鐘。小強與小聰會在起跑後多久相遇？

Stone and Chung are running on a 100km track. They start at the same time. Stone runs from the start point to the end point at a speed of 3km/h. Chung runs from the end point to the start point at a speed of 5km/h. Stone has to take a 30 minute rest for every 6km he has run. Chung has to take a 15 minute rest for every 5km he has run. How long will it take for Stone and Chung to meet each other?

9. 本年度香港小學數學創意解難比賽的舉行日期為6月18日。一般來說，如果日期數字是月份數字的倍數，那天便可稱為「吉日」。例如，6月18日中，日期數字為18，月份數字為6，而18是6的倍數，所以6月18日是「吉日」。
- 在2022年有多少天是吉日呢？

The competition day of Hong Kong Mathematics Creative Problem Solving Competition this year is 18/6. In general, if the day number is a multiple of the month number, the day is called a “Lucky Day”. For example, consider the date 18/6, the day number is 18 and the month number is 6, where 18 is a multiple of 6, hence 18/6 is a “Lucky Day”.

How many “Lucky Day” are there in the year 2022?

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10. 某遊樂場的遊戲活動如下：每參加一次活動，參加者的積分會先增加一倍，但活動後需收取40積分。

小明參加了三次遊戲後，發現自己只剩下40積分，剛好足夠繳付最後遊戲的積分。

小明原有積分多少？

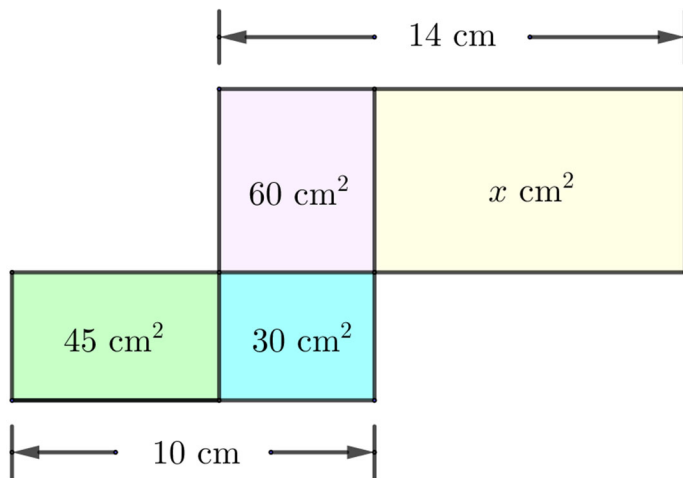
The rule of a game in an amusement park is as follow: For each game, the credit of a participant will first be doubled, but the participant has to pay 40 credits after playing the game.

After Billy played the game three times, he had 40 credits left, which was just enough form him to pay for the game.

How many credits did Billy originally have?

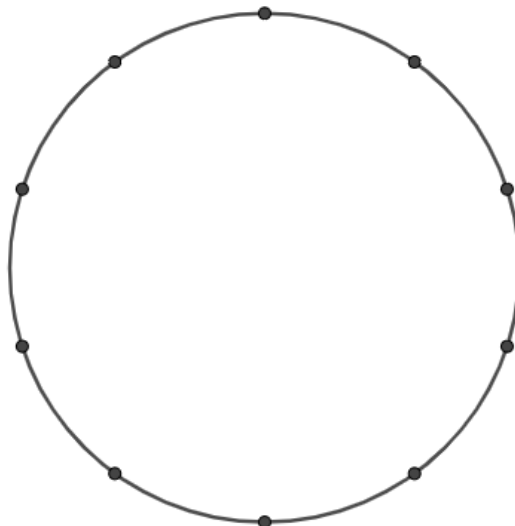
11. 圖中的四個長方形以邊貼邊的方式連接。求  $x$  的值。

In the figure, there are four rectangles joining side by side as shown. Find the value of  $x$ .



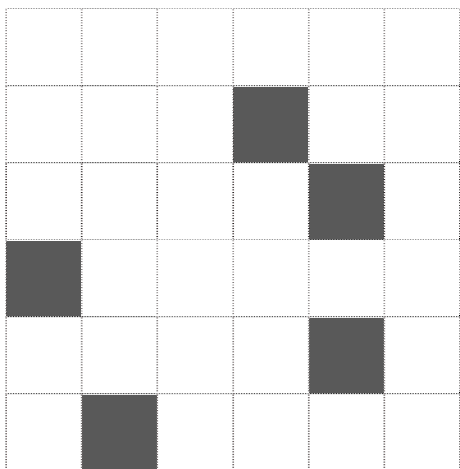
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12. 在圓形釘板上有 10 個平均分佈的釘，在此圓形釘板上能夠製作出多少款不同的三角形？  
There are 10 equally distributed pegs on a circular pegboard. How many different triangles can be made on this circular pegboard?



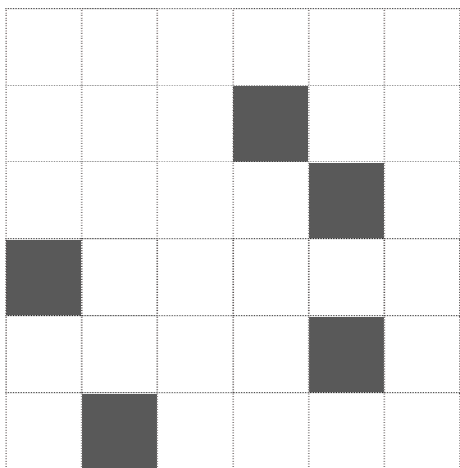
13. (a) 把下圖的 3 個方格塗黑，使得出的圖案成為一個軸對稱圖案，並畫出對稱圖案的對稱軸。

Blacken 3 boxes in the diagram below to obtain a diagram with reflectional symmetry, and draw the axis of reflection.



- (b) 把下圖的 4 個方格塗黑，使得出的圖案成為一個軸對稱圖案，並畫出對稱圖案的對稱軸。

Blacken 4 boxes in the diagram below to obtain a diagram with reflectional symmetry, and draw the axis of reflection.



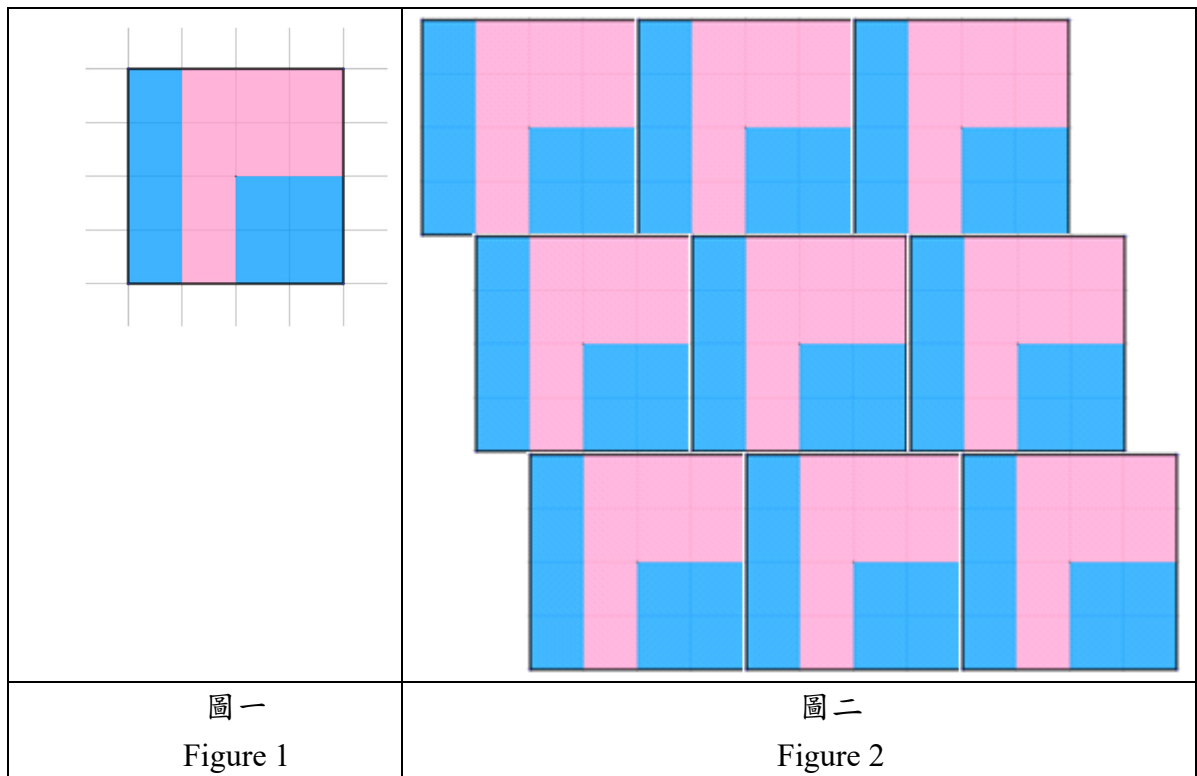


**乙部 (建議此部用 15 分鐘作答)**

**Section B (Suggested to use 15 minutes in this Section)**

1. 圖一顯示一塊只有兩種顏色的正方形瓷磚，兩種顏色均佔正方形的 50%。若把這塊瓷磚以圖二的方式排列，則會形成一款由兩種不同顏色但相同形狀及大小的圖案密鋪而成的設計。

Figure 1 shows the design of a square tile with two different colours. Each colour occupies 50% of the area of the square. If such square tiles are arranged as shown in figure 2, a two-colour tessellation tile pattern having the same shape and the same pattern can be designed.



- (a) 設計三款只有兩種顏色的正方形瓷磚，兩種顏色均佔正方形的 50%，並可砌成如圖二般的密鋪圖案。請畫出正方形瓷磚的設計及密鋪平面。

Design 3 square tiles containing two different colours with each colour occupying 50% of the area of the square tile. Then, tessellate with the square tiles like the one as shown in figure 2. Draw your square tile designs as well as the tessellated plane.

- (b) 設計一款可填上多於是兩種顏色的正方形瓷磚圖案（註：同一圖案可填上不同的顏色。），利用這瓷磚密鋪平面後，會得出只有一種圖案的磚密鋪平面，顏色不同而形狀與大小相同，在密鋪平面中每種顏色的圖案所佔的面積是正方形面積的 50%。請畫出正方形瓷磚的設計及密鋪平面。

Design a square tile with patterns filled with more than 2 colours. (Note that different colour can be filled in the same pattern). After tessellating a plane with these tiles, you obtain only one pattern of different colours in the tessellated plane in which the area of the pattern is 50% of the area of the original square tile.

Draw your square tile designs indicating the colour of each pattern as well as the tessellated plane.

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全卷完  
End of Paper

2021/22 第十六屆香港小學數學創意解難比賽

2021/22 The 16<sup>th</sup> Hong Kong Mathematics Creative Problem Solving Competition  
for Primary Schools

答題紙 Answer sheets

學校名稱 School Name :
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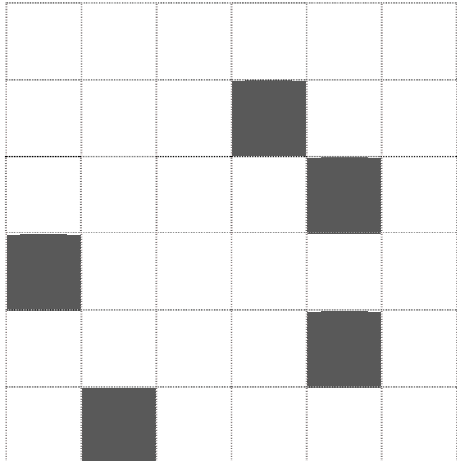
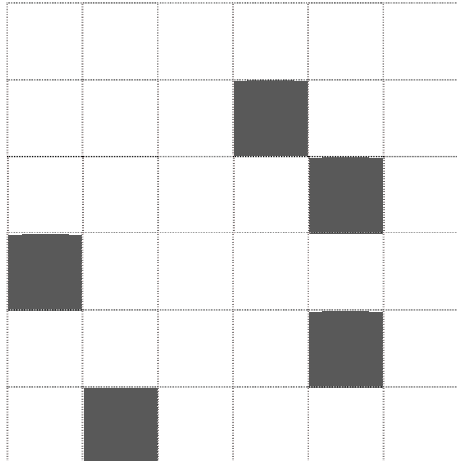
得分 Score :

/26

甲部 Section A

答案 Answers	評分 Marks
1. 六年級最少要有多少個學生，才能確保有 20 個學生在相同的月份生日？ At least how many primary six students are there in order to have 20 of them born in the same month? 答/Ans: _____	/2
2. 從 3、4、5、14、28、29 和 43 中選出 3 個不同的數，它們的和是奇數的方法共有多少個？ If three different numbers are selected among the integers 3, 4, 5, 14, 28, 29 and 43, how many of the combinations have the sum being odd numbers? 答/Ans: _____	/2
3. 用 5 元和 10 元硬幣換 50 元紙幣的方法能有多少種？ How many ways can a \$50 note be exchanged using \$5 and \$10 coins only? 答/Ans: _____	/2
4. 他共寫了數字「9」多少次？ How many digit '9' does he write? 答/Ans: _____	/2

<p>5. a) <b>最少</b>有多少位學生可能同時是田徑隊和游泳隊？</p> <p><b>At least</b> how many students are members of both athletics team and swimming team?</p> <p>b) <b>最多</b>有多少位學生可能同時是田徑隊和游泳隊？</p> <p><b>At most</b> how many students are members of both athletics team and swimming team?</p>	<p>(a) 答/Ans: _____</p> <p>(b) 答/Ans: _____</p>	/2
<p>6. 在下式的方格內填上一個正分數，使得算式的結果化至最簡後是一個分母為5的真分數。</p> <p>Fill in a positive fraction in the box of the expression below to make the result of the expression, in simplest form, a fraction with denominator equal to 5.</p> $\frac{24}{1001} - \boxed{\phantom{\frac{13}{77}}}$	<p>答/Ans: _____</p>	/2
<p>7. 求 <math>\triangle CDF</math> 的面積。</p> <p>Find the area of <math>\triangle CDF</math>.</p>	<p>答/Ans: _____</p>	/2
<p>8. <u>小強</u>與<u>小聰</u>會在起跑後多久相遇？</p> <p>How long will it take for Stone and Chung to meet each other?</p>	<p>答/Ans: _____</p>	/2
<p>9. 在 2022 年有多少天是吉日呢？</p> <p>How many “Lucky Day” are there in the year 2022?</p>	<p>答/Ans: _____</p>	/2

<p>10. 小明原有積分多少？ How many credits did Billy originally have?</p>	<p>答/Ans: _____</p> <p>/2</p>
<p>11. 求 <math>x</math> 的值。 Find <math>x</math>.</p>	<p>答/Ans: _____</p> <p>/2</p>
<p>12. 在圓形釘板上有 10 個平均分佈的釘，在此圓形釘板上能夠製作出多少款不同的三角形？ There are 10 equally distributed pegs on a circular pegboard. How many different triangles can be made on this circular pegboard?</p>	<p>答/Ans: _____</p> <p>/2</p>
<p>13. (a) 把下圖的 3 個方格塗黑，使得出的圖案成為一個軸對稱圖案，並畫出對稱圖案的對稱軸。 Blacken 3 boxes in the diagram below to obtain a diagram with reflectional symmetry, and draw the axis of reflection.</p> 	<p>(b) 把下圖的 4 個方格塗黑，使得出的圖案成為一個軸對稱圖案，並畫出對稱圖案的對稱軸。 Blacken 4 boxes in the diagram below to obtain a diagram with reflectional symmetry, and draw the axis of reflection.</p>  <p>/2</p>

## 乙部 Section B

1. (a) 設計三款只有兩種顏色的正方形瓷磚，兩種顏色均佔正方形的 50%，並可砌成如圖二般的密鋪圖案。請畫出正方形瓷磚的設計及密鋪平面。

Design 3 square tiles containing two different colours with each colour occupying 50% of the area of the square tile. Then, tessellate with the square tiles like the one as shown in figure 2. Draw your square tile designs as well as the tessellated plane.

設計一(磁磚設計)

Design 1 (The tile design)



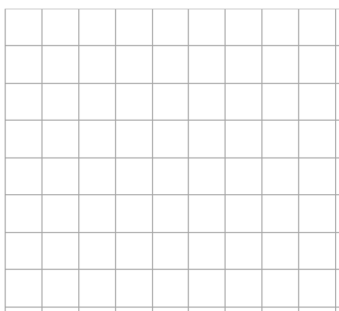
設計一(密鋪效果)

Design 1 (The tessellated plane)



設計二(磁磚設計)

Design 2 (The tile design)



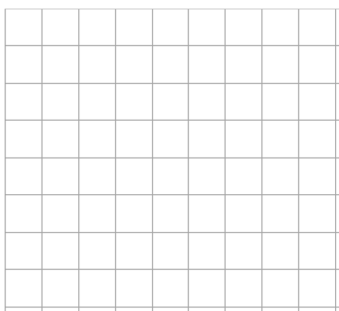
設計二(密鋪效果)

Design 2 (The tessellated plane)



設計三(磁磚設計)

Design 3 (The tile design)



設計三(密鋪效果)

Design 3 (The tessellated plane)





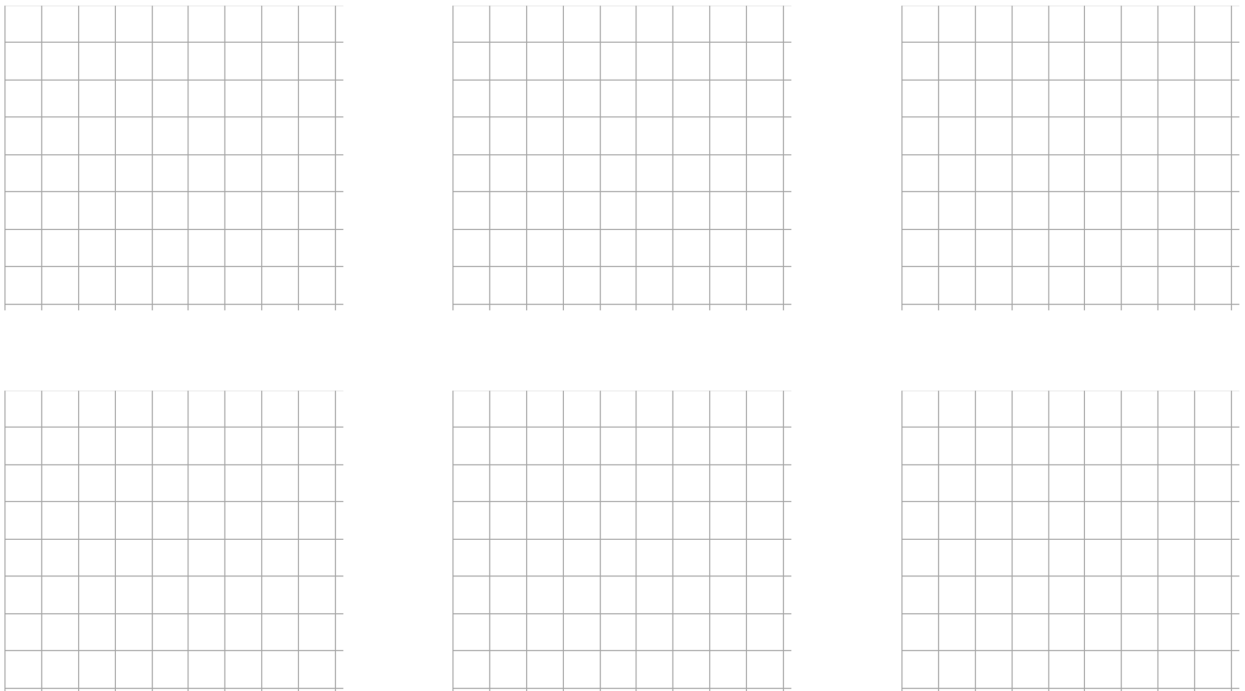
- (b) 設計一款或以上可填上多於是兩種顏色的正方形瓷磚圖案（註：同一圖案可填上不同的顏色。），利用這瓷磚密鋪平面後，會得出只有一種圖案的磚密鋪平面，顏色不同而形狀與大小相同，在密鋪平面中每種顏色的圖案所佔的面積是正方形面積的 50%。請畫出正方形瓷磚的設計及密鋪平面。

Design one or more square tiles with patterns filled with more than 2 colours. (Note that different colour can be filled in the same pattern). After tessellating a plane with these tiles, you obtain only one pattern of different colours in the tessellated plane in which the area of the pattern is 50% of the area of the original square tile.

Draw your square tile designs indicating the colour of each pattern as well as the tessellated plane.

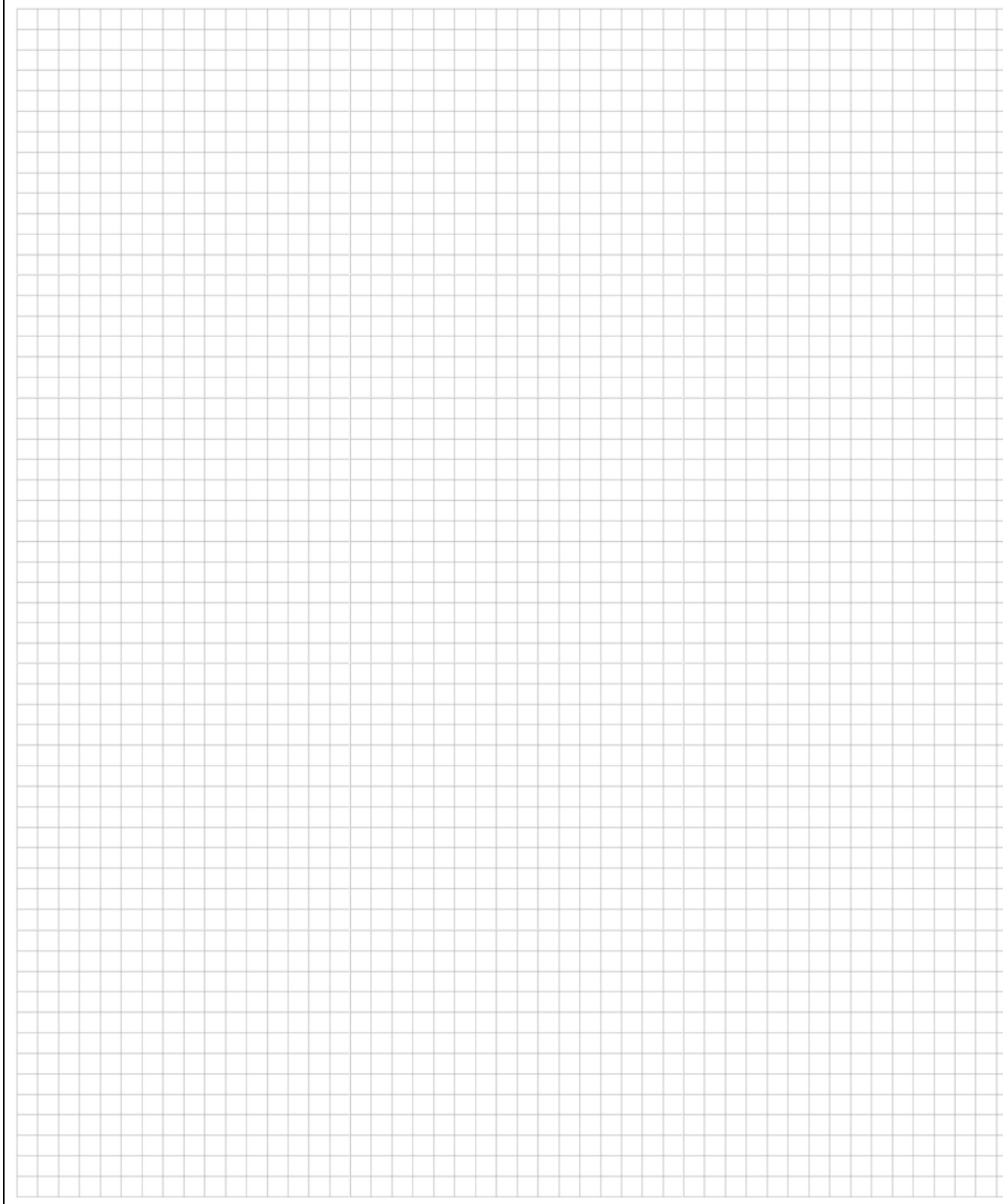
### 磁磚設計

#### The tiles design



密鋪效果

The tessellated plane



答題紙完

**End of Answer Sheets**