2017/18「第九屆香港中學數學創意解難比賽」

初賽題目（筆試）及 參考答案

題 1 **(2 分)**

已知$2015 \times 2016 \times 2017 \times 2018 + k$ 為一完全平方數，如果 k 是一個正整數，求 k 的最小值。

Question 1 (2 marks)

It is given that $2015 \times 2016 \times 2017 \times 2018 + k$ is a perfect square. If k is a positive integer, find the least value of k.

建議題解：

設 n 為一正整數。

$n(n+1)(n+2)(n+3) + \mathrm{k}$

$= n(n+3)(n+1)(n+2) + \mathrm{k}$

$= (n^2+3n)(n^2+3n+2) + k$

$= (n^2+3n)^2 + 2(n^2+3n) + k$

如果 k 取最小值，k = 1 時上式將可以變為一個完全平方數。

Suggested Solutions:

Let n be a positive integer.

$n(n+1)(n+2)(n+3) + \mathrm{k}$

$= n(n+3)(n+1)(n+2) + \mathrm{k}$

$= (n^2+3n)(n^2+3n+2) + k$

$= (n^2+3n)^2 + 2(n^2+3n) + k$

For the least value of k, if $k = 1$, a completed square could be formed.

題 2 **(2 分)**

定義 $n\,! = n \times (n-1) \times (n-2) \times \ldots \times (1)$，其中 n 是正整數。

例如：

$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$

設 x 為 2018!。問 x 這數字的結尾有多少個「零」？

Question 2 (2 marks)

Define $n\,! = n \times (n-1) \times (n-2) \times \ldots \times (1)$, when n is a positive integer.

For Example,

$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$

Let x be 2018!. How many zero digits are there at the end of x?

建議題解：

結尾的 0 的數目與 2018!中 10 的因數數目相同。在 2018!中，先求出 “5”的因數數目

$\left\lfloor \frac{2018}{5} \right\rfloor = 403$, $\left\lfloor \frac{2018}{25} \right\rfloor = 80$, $\left\lfloor \frac{2018}{125} \right\rfloor = 16$, $\left\lfloor \frac{2018}{625} \right\rfloor = 3$

因數 5 的總數目$= 403 + 80 + 16 + 3 = 502$

∵ 因數 5 的總數目必定少於因數 2 的總數目，所以一定有足夠的因數 2 去與因數 5 配合成為因數 10。所以共有 502 個因數 10。

∴ 在 2018!中，尾數共有 502 個零。

Suggested Solutions:

The number of zero digits is equal to the number of factor 10 in 2018!.

We will find the number of factor 5 in 2018! first.

$\left\lfloor \frac{2018}{5} \right\rfloor = 403$, $\left\lfloor \frac{2018}{25} \right\rfloor = 80$, $\left\lfloor \frac{2018}{125} \right\rfloor = 16$, $\left\lfloor \frac{2018}{625} \right\rfloor = 3$

Total no. of factor 5 = $403 + 80 + 16 + 3 = 502$

∵ Total no. of factor 5 must be less than Total no. of factor 2. There must be enough 2s’ to match the 5s’ to form a 10. So there are 502 of factor 10.

∴ There are 502 zeros at the end of 2018!.

題 3 (2 分)

吳媽媽有一子一女，阿忠和阿慈。她收入不多，但在每個月的月頭，都會把零用錢給阿忠或阿慈。為了公平，她設計了一個特別的輪換辦法。

第 1 至第 n 個月	誰得零用錢
1	忠
1 – 2	忠慈
1 – 4	忠慈慈忠
1 – 8	忠慈慈忠慈忠忠慈
1 – 16	忠慈慈忠慈忠忠慈慈忠忠慈忠慈慈忠

在第四十和第四十一個月，誰人將會得到零用錢？

Question 3 (2 marks)

Mrs Ng has a son and a daughter, Bill and Amy (B & A). She does not earn a lot but she will give pocket money either to Bill or Amy at the beginning of each month. She designs a fair way to give the pocket money.

1^{st} to n^{th} month	Who gets the pocket money
1	B
1 – 2	BA
1 – 4	$BAAB$
1 – 8	$BAABABBA$
1 – 16	$BAABABBAABBABAAB$

Who will get the pocket money at the 40^{th} and 41^{st} months respectively ?

建議題解：

第 40 和第 41 個月

⇔ (第 8 和第 9 個月)的相反

⇔ (慈 和 慈) 的相反

⇔ 忠忠

Suggested Solutions：

40^{th} and 41^{st}

⇔ negation of (8^{th} and 9^{th})

⇔ negation of (A and A)

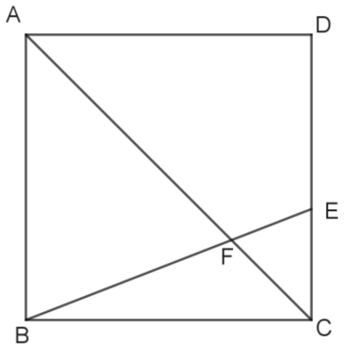
⇔ BB

題 4 (2 分)

在圖中 $ABCD$ 是一個邊長為 10 厘米的正方形，如果三角形 ABF 的面積是 36 平方厘米，求 CE 的長度。

Question 4 (2 marks)

In the figure, $ABCD$ is a square with side 10 cm. If the area of ΔABF is 36 cm^2, find the length of the side CE.



建議題解：

ΔABC 面積 $= \frac{10\times10}{2} = 50\ \text{cm}^2$

ΔBFC 面積 $= 50 - 36 = 14\ \text{cm}^2$

$\text{AF} : \text{FC} = 36 : 14 = 18 : 7$

$\because \Delta\text{ABF} \sim \Delta\text{CEF}$

$\therefore \text{AB} : \text{EC} = \text{AF} : \text{FC}$

$$\frac{10}{\text{EC}} = \frac{18}{7}$$

$\text{EC} = \frac{35}{9}\ \text{cm}$

Suggested Solutions:

Area of $\Delta\text{ABC} = \frac{10\times10}{2} = 50\ \text{cm}^2$

Area of $\Delta\text{BFC} = 50 - 36 = 14\ \text{cm}^2$

$\text{AF} : \text{FC} = 36 : 14 = 18 : 7$

$\because \Delta\text{ABF} \sim \Delta\text{CEF}$

$\therefore \text{AB} : \text{EC} = \text{AF} : \text{FC}$

$$\frac{10}{\text{EC}} = \frac{18}{7}$$

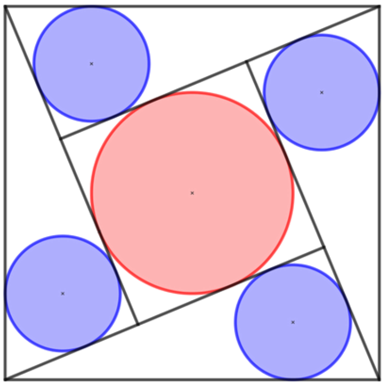
$EC = \frac{35}{9}\ \text{cm}$

題 5 **(2 分)**

在圖中，正方形內有 4 個全等的直角三角形。如果大正方形的邊長為 13 厘米，而 4 個小圓形的半徑為 2 厘米，求大圓的半徑。

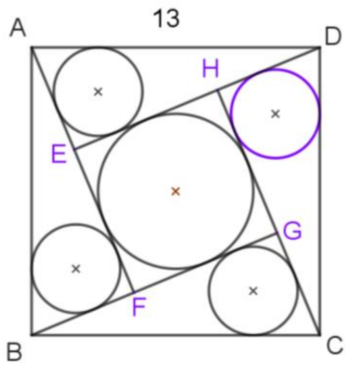
Question 5 **(2 marks)**

In the figure, 4 congruent right-angled triangles are arranged inside a square as shown. If the larger square has side length 13 cm and the radii of small circles are 2 cm, find the radius of the larger circle.



建議題解/ Suggested Solutions：

設 $AE = BF = CG = DH = a$ 及 $AF = BG = CH = DE = b$



$$\begin{cases} ab = (2)(a+b+13) & \text{...(1)} \\ a^2 + b^2 = 13^2 & \text{...(2)} \end{cases}$$

由/ From (1),

$$\frac{ab}{2} - 13 = a + b$$

$$\frac{(ab)^2}{4} - 2\left(\frac{ab}{2}\right)(13) + 13^2 = a^2 + 2ab + b^2$$

$$\frac{(ab)^2}{4} - 13ab + 13^2 = 13^2 + 2ab \qquad (by\ (2))$$

$$ab = 60$$

$$a^2 + b^2 - 2ab = 13^2 - 2(60)$$

$$(b-a)^2 = 49$$

$$b - a = 7$$

∴ 大圓的半徑 / Radius of larger circle = 3.5 cm

題 6 **(2 分)**

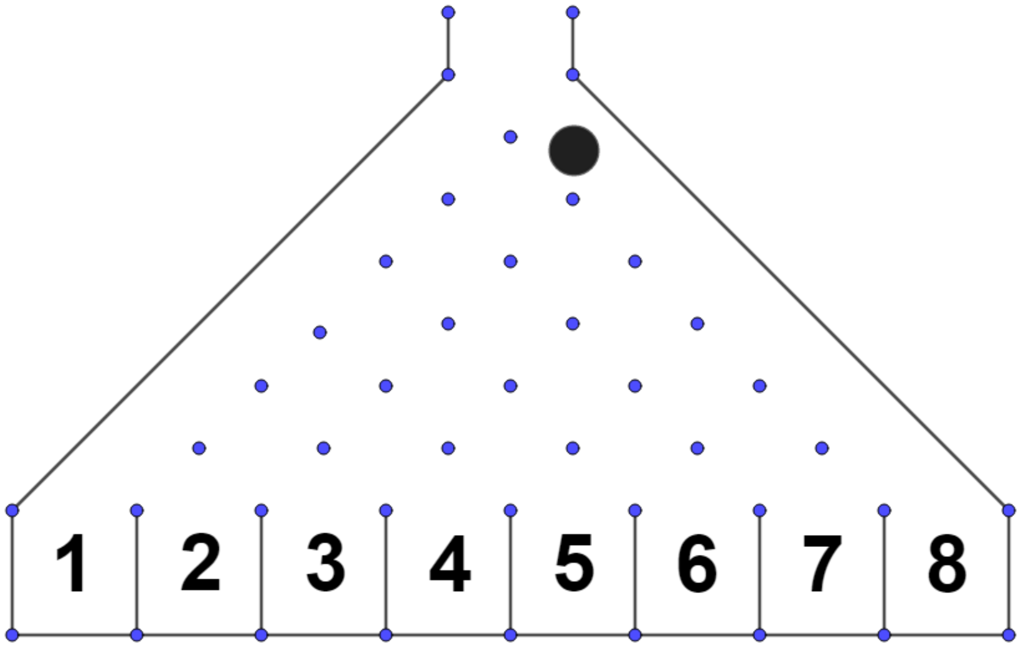
圖中的釘板是用作遊戲使用。你會放入一枚圓形的硬幣並讓它掉到 8 個位置中的其中一個。當硬幣碰到一口釘時，它彈至左或右的機會是均等的。

如果有一枚硬幣在圖中的位置掉下，它最有機會掉至那一個位置?

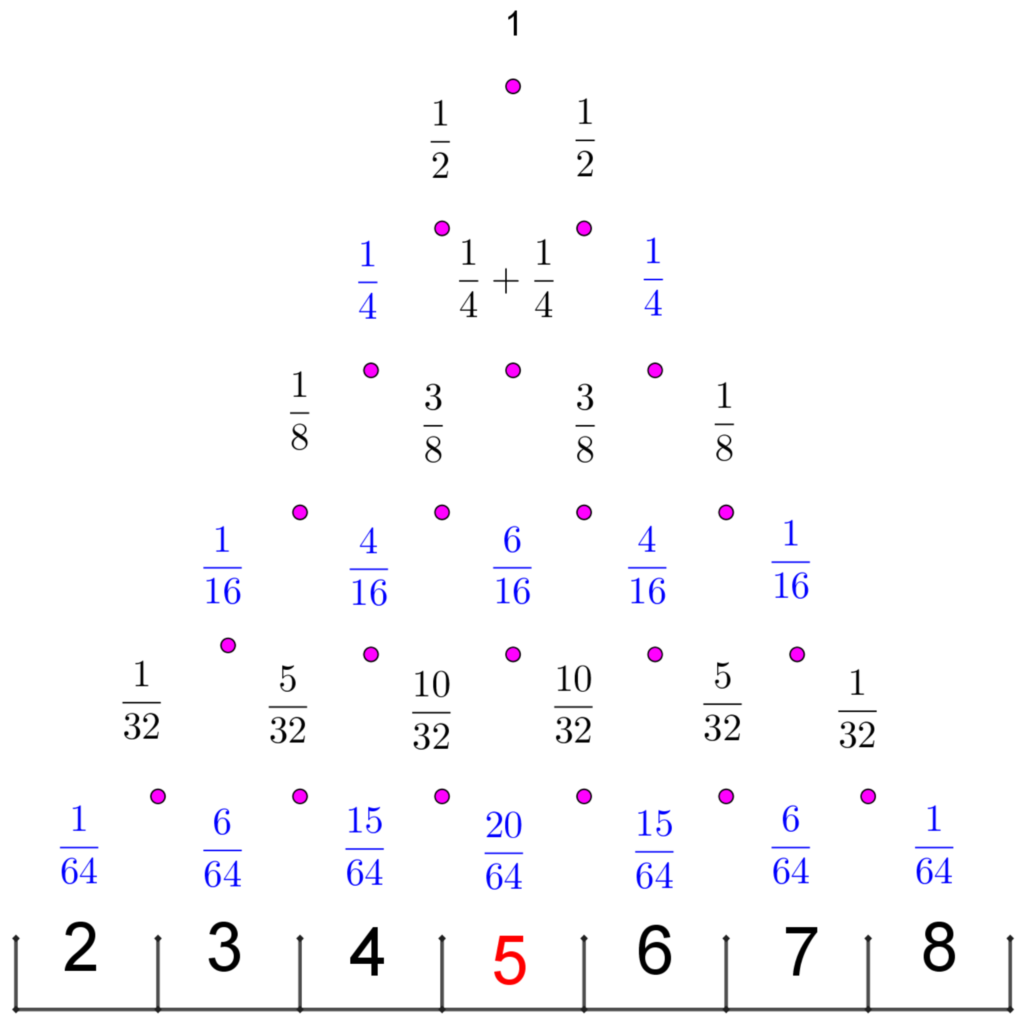
Question 6 **(2 marks)**

The figure shows a peg board used for a game show. Whenever the circular chip falls onto a peg, it has an equal chance to bounce left or right.

If the chip is dropped from the location shown, which position would it most likely fall to?



建議題解/ Suggested Solutions：



它最有機會掉至 5 號位置。

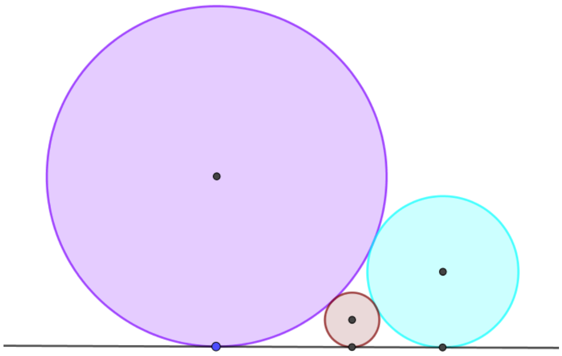
It most likely falls to position 5.

題 7 **(2 分)**

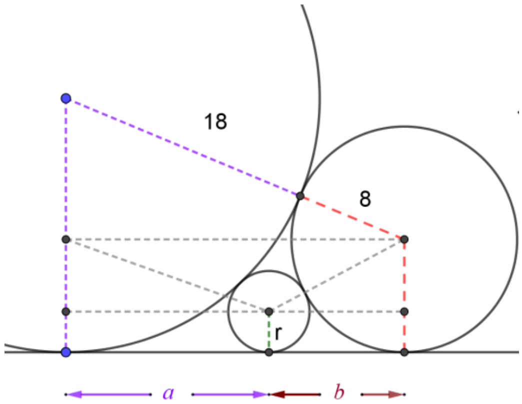
圖中有 3 個外接的圓，如果兩個較大的圓的半徑為 18 厘米及 8 厘米，求最小的圓的半徑。

Question 7 **(2 marks)**

The figure shows 3 touching circles. If the radii of the two larger circles are 18 cm and 8 cm respectively, find the radius of the smallest circle.



建議題解/ Suggested Solutions：



$$\begin{cases} a^2 &= (18+r)^2-(18-r)^2 &= 72r & \ldots(*) \\ b^2 &= (8+r)^2-(8-r)^2 &= 32r & \ldots(**) \\ (a+b)^2 &= (18+8)^2-(18-8)^2 &= 576 & \ldots(***) \end{cases}$$

$\sqrt{(*)(**)}$,

$$ab = \sqrt{(72r)(32r)} = 48r$$

From $(***)$,

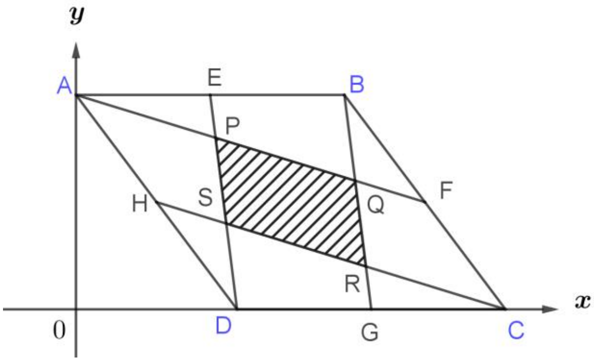
$$\begin{aligned} a^2+b^2+2ab &= 576 \\ 72r+32r+2(48r) &= 576 \\ r &= 2.88 \end{aligned}$$

題 8 **(2 分)**

已知A點的坐標是 $(0,4)$ 而 C, D 都在x 軸上，E、F、G 及 H 分別為 AB、BC、CD 及 DA 的中點。如果 $ABCD$ 為一菱形及 $AB = 5$，求 陰影部分 $PQRS$ 的面積。

Question 8 **(2 marks)**

Given that the coordinate of $A = (0,4)$ and C, D lies on x-axis. E, F, G and H are mid-points of AB, BC, CD and DA respectively. If $ABCD$ is a rhombus and $AB = 5$, find the area of the shaded region $PQRS$.

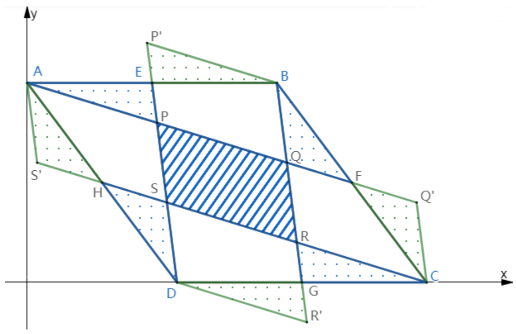


建議題解：

ΔSDH , ΔPAE, ΔQBF 和 ΔRCG 分別沿着 H, E, F 和 G 順時針方向旋轉 $180°$，我們分別得出 $\Delta S'AH$，$\Delta P'BE$，$\Delta Q'CF$ 和 $\Delta R'DG$.

得知平行四邊形 $PQRS$， $APSS'$，$P'BQP$ ，$QQ'CR$ 和 $SRR'D$ 是全等。

$\therefore$ $PQRS$的面積 $= \frac{1}{5}(5 \times 4) = 4$ 平方單位

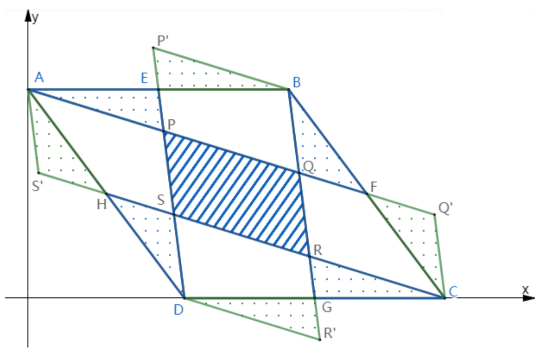


Suggested Solutions:

By rotating the triangles ΔSDH , ΔPAE, ΔQBF and ΔRCG $180°$ clockwise about H, E, F and G , we obtain $\Delta S'AH$, $\Delta P'BE$, $\Delta Q'CF$ and $\Delta R'DG$ respectively.

Notice the parallelograms $PQRS$, $APSS'$, $P'BQP$, $QQ'CR$ and $SRR'D$ are congruent.

$\therefore$ Area of $PQRS = \dfrac{1}{5}(5 \times 4) = 4$ sq. units



題 9 **(2 分)**

我們將定義以下的運算方法:

$$(a,b)*(c,d)=(ad+bc,bd)$$

$$(ka,kb)=(a,b)$$

$$(a,b)\Delta(c,d)=(ac,bd)$$

其中 a, b, c, d, k 為實數，並且 b , d 和 k 不等於 0。

(a) 如果 $(1,2)*(x,y)=(5,6)$，求$(x,y)\ \Delta\ (1,6)=?$

(b) $(1, 2)\ \Delta\ (2, 3)\ \Delta\ (3, 4)\ \Delta \ldots \Delta\ (2017, 2018) = ?$

Question 9 **(2 marks)**

We are going to define the following operations:

$$(a,b)*(c,d)=(ad+bc,bd)$$

$$(ka,kb)=(a,b)$$

$$(a,b)\Delta(c,d)=(ac,bd)$$

Where a, b, c, d, k are all real numbers with b , d and k are not equal to 0.

(a) Given$(1,2)*(x,y)=(5,6)$, then $(x,y)\ \Delta\ (1,6)=?$

(b) $(1, 2)\ \Delta\ (2, 3)\ \Delta\ (3, 4)\ \Delta \ldots \Delta\ (2017, 2018) = ?$

建議題解/ Suggested Solutions：

(a)

$(1,2)*(x,y)=(5,6)$
$(y+2x,2y)=(5,6)$

$\therefore\quad y=3k, x=k$

$(x,y)\Delta(1,6)$

$=(x,6y)$

$=(k,18k)$

$=(1,18)$

(b)

$(1,2)\Delta(2,3)\Delta(3,4)\Delta\ldots\Delta(2017,2018)$
$=(1\cdot 2\cdot 3\ldots\cdot 2017, 2\cdot 3\cdot 4\ldots 2018)$
$=(1,2018)$

題 10 **(2 分)**

在一個正方形內有 15 點，它們與正方形的 4 個頂點均被一些不相交的線段連起，使到整個正方形完全被分割成很多個三角形。請問總共可以分割成多少個三角形呢?

Question 10 **(2 marks)**

There are 15 points inside a square. They are all connected by non-intersecting line segments with each other and with the vertices of the square, in such a way that the square is dissected into triangles. How many triangles will we have?

建議題解：

開始時，我們有正方形的 4 個頂點，

在正方形內任意加上一點，我們得 4 個三角形。

在其中一個部份加上第二點，我們再得 2 個三角形。

在其中一個部份加上第三點，我們再得 2 個三角形。 } 14 次

....

因此，

共有三角形 = 4 + 2 + 2 + ... 2 = 4 + 2 (14) = 32 個。

Suggested Solutions：

Initially, we have a square with 4 vertices only,

After adding the 1st point inside the square we have 4 triangles.

Adding the 2nd point inside any region we have 2 more triangles.

Adding the 3rd point inside any region we have 2 more triangles. } 14 times

....

Therefore,

Total number of triangles = 4 + 2 + 2 + ... 2 = 4 + 2 (14) = 32.

題 11 **(2 分)**

小明在用晚餐前看了手錶，發現時針與分針成 121° ；用餐後他再看手錶，發現時針與分針又再次成 121°。如果已知他是在晚上 6 時至 7 時用餐，求他的用餐時間。

Question 11 **(2 marks)**

Ming watched his watch before his dinner. He found that the angle formed between the hour hand and the minute hand was 121°. After the dinner, he watched his watch again. The angle formed between the hour hand and the minute hand was also 121° . If he had his dinner between 6 p.m. to 7 p.m. , find the time spent on his dinner.

建議題解： 時針的速度是：

$$\frac{360°}{12} \text{ 每 } 60 \text{ 分}$$

$$0.5° \text{ 每分}$$

分針的速度是： 6° 每分

晚餐是由 $6\!:\!x$ 至 $6\!:\!y$ $\quad 180° + 0.5°x - 6°x = 121°$

$$59° = 5.5°x$$

$$x = \frac{118}{11}$$

$$6°y - (180° + 0.5°y) = 121°$$

$$5.5°y = 301°$$

$$y = \frac{602}{11}$$

用餐時間是 $= \frac{602}{11} - \frac{118}{11} = 44$ 分鐘

Suggested Solutions: Speed of hour arm is

$$\frac{360°}{12} \text{ per 60 min} = 0.5° \text{ per min}$$

Speed of minutes arm: 6° per min

Dinner is from $6\!:\!x$ to $6\!:\!y$ $\quad 180° + 0.5°x - 6°x = 121°$

$$59° = 5.5°x$$

$$x = \frac{118}{11}$$

$$6°y - (180° + 0.5°y) = 121°$$

$$5.5°y = 301°$$

$$y = \frac{602}{11}$$

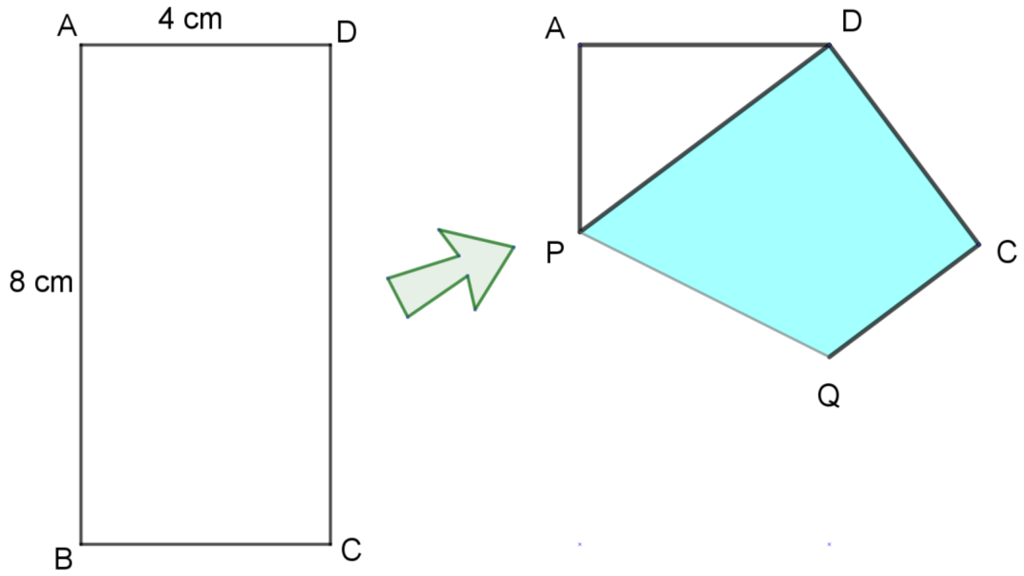
Time spent $= \frac{602}{11} - \frac{118}{11} = 44$ min.

題 12 **(2 分)**

把一個 4 cm × 8 cm 的長方形，如圖摺起使 B 點和 D 點重疊成五邊形 $APQCD$。求五邊形 $APQCD$ 的面積。

Question12 (2 marks)

A rectangle 4 cm × 8 cm in dimension is folded as shown in the figure so that point B and point D are overlapped to form a pentagon $APQCD$. Find the area of $APQCD$.



建議題解：

設 AP 為 x cm

$AP^2 + AD^2 = PD^2$ (畢氏定理)

$x^2 + 4^2 = (8 - x)^2$

$x = 3$

$\therefore$ $AP = 3$ cm , $PD = 5$ cm

運用對稱性, $QC = 3$ cm

$$APQCD\text{ 的面積} = \frac{(5+3)\times 4}{2} + \frac{3\times 4}{2}$$

$$= 22\text{ cm}^2$$

Suggested Solutions:

Let AP be x cm

$AP^2 + AD^2 = PD^2$ (Pyth. Thm.)

$x^2 + 4^2 = (8 - x)^2$

$x = 3$

$\therefore$ $AP = 3$ cm , $PD = 5$ cm

By symmetry, $QC = 3$ cm

$$\text{Area of } APQCD = \frac{(5+3)\times 4}{2} + \frac{3\times 4}{2} = 22\text{ cm}^2$$

題 13 **(2 分)**

設 $\lceil x \rceil$ 和 $\lfloor x \rfloor$ 分別代表向上和向下捨入的函數。

（例如 $\lceil 4.2 \rceil = \lceil 4.8 \rceil = 5$ 而 $\lfloor 3.46 \rfloor = \lfloor 3.99 \rfloor = 3$）

試計算 下列算式

$$\lceil \sqrt{1} \rceil + \lceil \sqrt{2} \rceil + \lceil \sqrt{3} \rceil + \cdots + \lceil \sqrt{100} \rceil - (\lfloor \sqrt{1} \rfloor + \lfloor \sqrt{2} \rfloor + \lfloor \sqrt{3} \rfloor + \cdots + \lfloor \sqrt{100} \rfloor)$$

的值。

Question13 **(2 marks)**

Let $\lceil x \rceil$ and $\lfloor x \rfloor$ represents the round up and round down functions respectively.
(For example, $\lceil 4.2 \rceil = \lceil 4.8 \rceil = 5$ while $\lfloor 3.46 \rfloor = \lfloor 3.99 \rfloor = 3$)

Find the value of the following expression,

$$\lceil \sqrt{1} \rceil + \lceil \sqrt{2} \rceil + \lceil \sqrt{3} \rceil + \cdots + \lceil \sqrt{100} \rceil - (\lfloor \sqrt{1} \rfloor + \lfloor \sqrt{2} \rfloor + \lfloor \sqrt{3} \rfloor + \cdots + \lfloor \sqrt{100} \rfloor)$$

建議題解：

$$\lceil \sqrt{x} \rceil - \lfloor \sqrt{x} \rfloor = \begin{cases} 0 & \text{當 } x \text{為正方形數.} \\ 1 & \text{其他情況} \end{cases}$$

∵ 1 至 100 內有 10 個正方形數

∴ 要求的值 = 100 – 10 = 90

Suggested Solutions:

$$\lceil \sqrt{x} \rceil - \lfloor \sqrt{x} \rfloor = \begin{cases} 0 & \text{when } x \text{ is a square no.} \\ 1 & \text{otherwise} \end{cases}$$

∵ There are 10 square no. from 1 to 100 inclusively

∴ Required value = 100 – 10 = 90

題 14 **(2 分)**

如果 k 個連續整數之和是 2018 並且 $1 < k < 2018$，求這 k 個連續整數中最小的數。

Question14 **(2 marks)**

If the sum of k consecutive integers is 2018 and $1 < k < 2018$. Find the smallest number in these k integers.

建議題解：

$$\frac{k}{2}(2a+k-1)=2018$$
$$k(2a+k-1)=4036$$

把 4036 因式分解， k 的可能值為 1009 或 2018。 考慮到 a 為整數， k 只可以為 1009，因此 $a = -502$.

即首項為–502 ，共有 1009 連續整數。

Suggested Solutions:

$$\frac{k}{2}(2a+k-1)=2018$$
$$k(2a+k-1)=4036$$

By factorizing 4036, possible values of k = 1009 or 2018. By considering a is also an integer, the only possible value of k is 1009, thus returning $a = -502$.

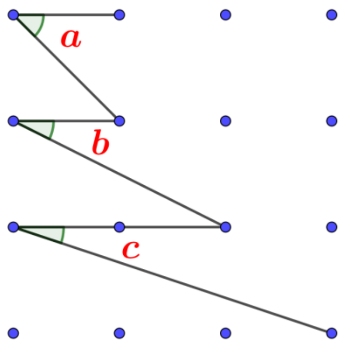
i.e. the 1st term is –502 and there are 1009 consecutive numbers.

題 15 **(2 分)**

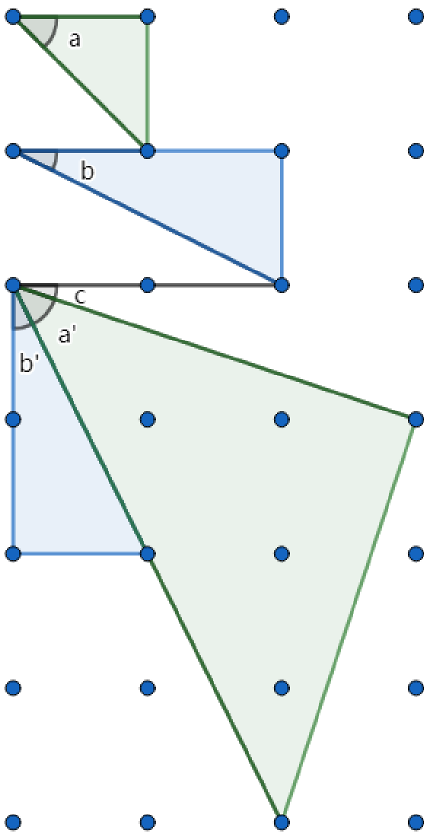
圖中為一等距釘板，求圖中角 a, b及c 之和。

Question15 **(2 marks)**

The figure shows an equidistant geoboard. Find the sum of angles a, b and c shown in the figure.



建議題解/ Suggested Solutions：



$a' = a$, $b' = b$

$\therefore \quad a + b + c = a' + b' + c = 90°$

題 16 **(4 分)**

在方程

$$(x^2-5x+5)^{(x^2-11x+30)}=1$$

中，求所有的實數解之和。

Question16 **(4 marks)**

Find the sum of all real roots in this equation,

$$(x^2-5x+5)^{(x^2-11x+30)}=1\,.$$

建議題解：

$$(x^2-5x+5)^{(x^2-11x+30)}=1\,.$$

$x^2-11x+30=(x-5)(x-6)$

情況一： $x^2-5x+5=1$ 和 $x^2-11x+30=K$， K 為非零整數

兩實根之和 = 5

情況二： $x^2-5x+5\neq 0$ 和 $x^2-11x+30=0$

兩實根之和 = 11

情況三： $x^2-5x+5=-1$ 和 $x^2-11x+30=2K$， K 為非零整數

兩實根之和 = 5

∴ 所有的實數解之和 =5 + 5 + 11 = 21

Suggested Solutions:

$$(x^2-5x+5)^{(x^2-11x+30)}=1\,.$$

$x^2-11x+30=(x-5)(x-6)$

Case I: $x^2-5x+5=1$ and $x^2-11x+30=K$, where K is a non-zero integer

Sum of 2 real root = 5

Case II: $x^2-5x+5\neq 0$ and $x^2-11x+30=0$

Sum of 2 real root = 11

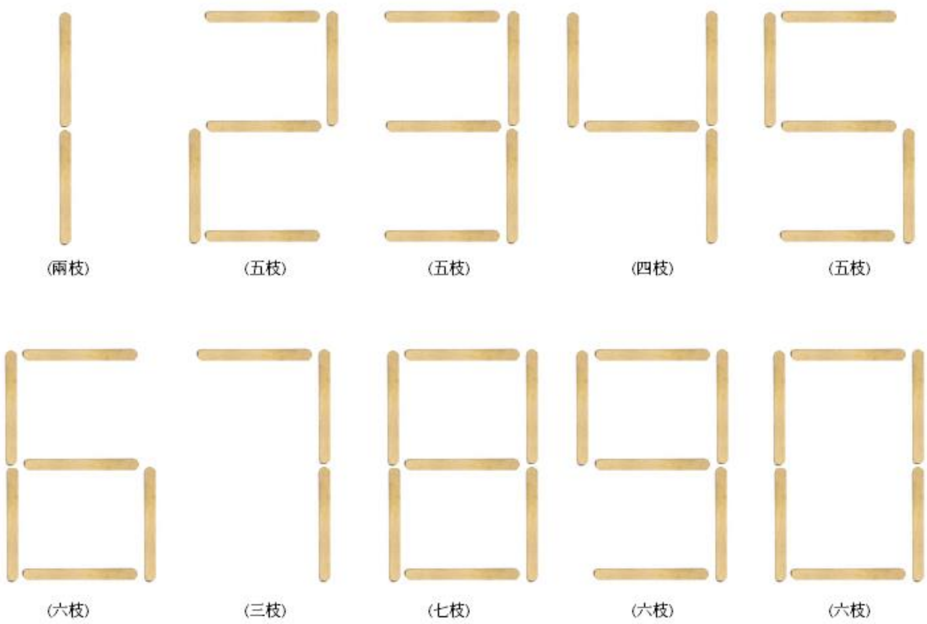
Case III: $x^2-5x+5=-1$ and $x^2-11x+30=2K$, where K is a non-zero integer

Sum of 2 real root = 5

∴ sum of all real roots =5 + 5 + 11 = 21

題 17 **(3 分)**

利用雪條棒可以砌出以下的數字。

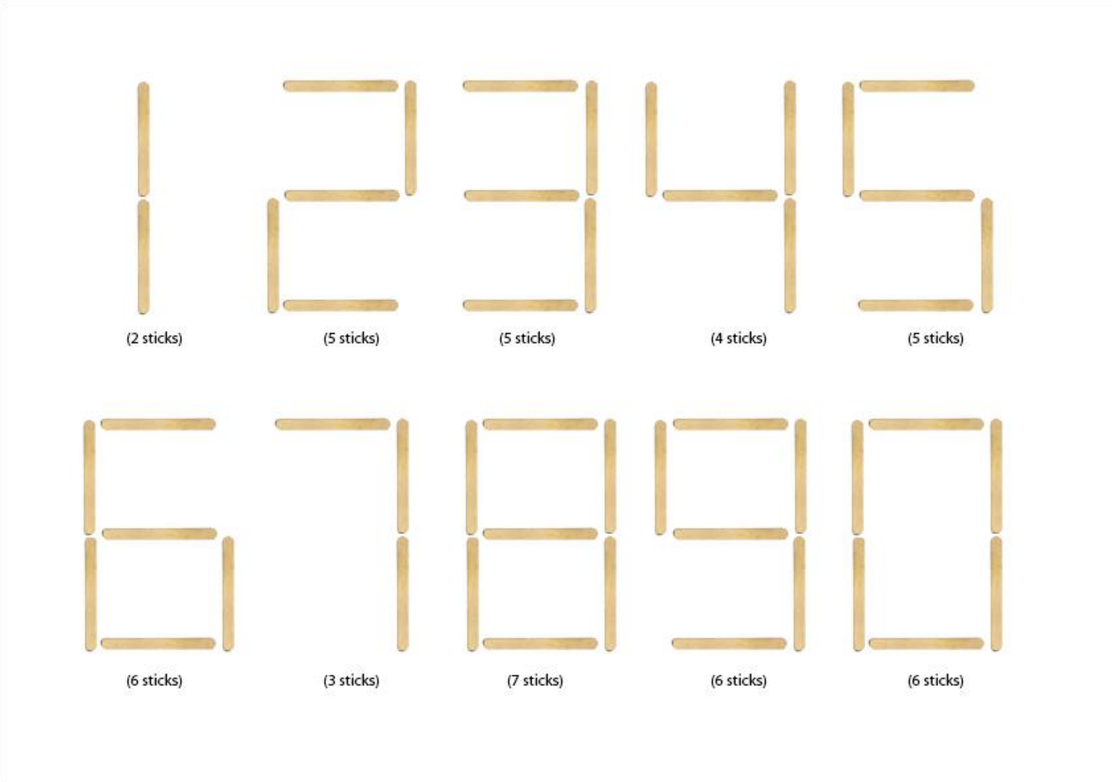


現有 30 枝雪條棒，用盡 30 枝雪條棒砌出下列要求的數字。

(a) 最大的雙數;
(b) 最小 5 的倍數;
(c) 最大的 6 位 3 的倍數。

Question17 **(3 marks)**

The following digits can be formed by using popsicle sticks.



Now there are 30 popsicle sticks, by using all 30 sticks, form the required numbers to the following conditions.

(a) The greatest even number;
(b) The smallest number which is a multiple of 5;
(c) The greatest 6-digit number which is also a multiple of 3.

建議題解/ Suggested Solutions：

(a) 11,111, 111, 111, 114 $(2 \times 13 + 4)$
(b) 20080 $(5 + 6 \times 2 + 7 + 6)$
(c) 999531 $(6 \times 3 + 5 + 5 + 2)$

題 18 **(4 分)**

每隊參賽隊伍請提供一個 0 至 100 之間的數字（包括 0 和 100，也可以是小數）。計算所有收集的數字的平均數，再把答案乘以 0.8，以得到一個數字 C。

所提供的數字最接近 C 的 5 隊會各得 4 分。
不提供數字的隊伍和所提供的數字最不接近 C 的 10 隊會各得 0 分，其餘隊伍各得 1 分

Question 18 **(4 marks)**

Every team is required to provide a number between 0 and 100 (including 0 and 100, decimal number is also allowed). The average of all the numbers collected will be calculated and then be multiplied by 0.8 to get a number C.

The 5 teams that provide numbers closest to C will get 4 marks.

The 10 teams that provide numbers furthest away from C and the teams have not provided any numbers will get 0 marks. All the other teams will get 1 mark.

建議題解/ Suggested Solutions：

(*不適用/NA*)

題 19 **(4 分)**

只用直尺，完成以下任務:

註：你只可以連接圖中已有的點（包括 線/線段 與 線/線段 的新交點）來作出新的 線/線段。

(a) 在此矩形內圍出一塊面積等如此矩形面積五分一的四邊形。
(b) 在此正方形內圍出一塊面積等如此正方形面積三分一的三角形。
(c) 用一條直線把梯形分為面積相等的兩部分。
(d) 在此三角形內圍出面積等如此三角形面積四分一的另一個三角形。

Question19 **(4 marks)**

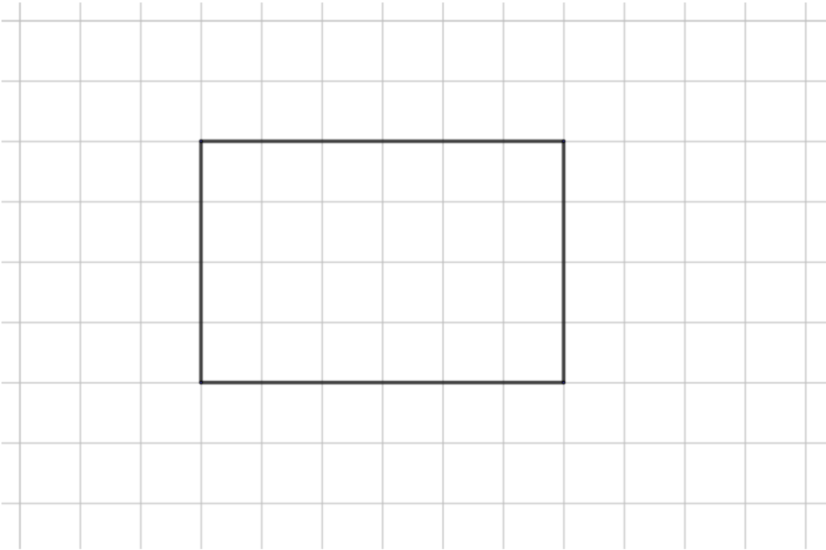
Using straightedge only to complete the following tasks:
Remark: You are only allowed to join points (including new intersections of lines / line segments) to form new lines / line segments.

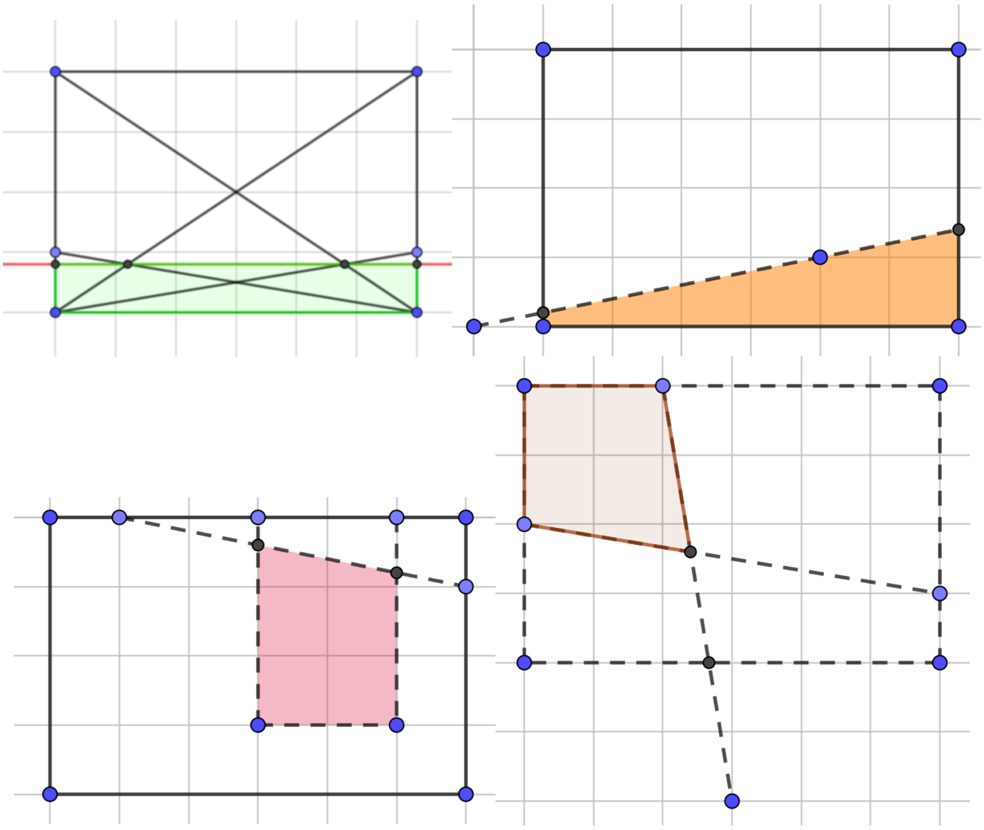
(a) Form a quadrilateral inside the rectangle which has one fifth of its area.
(b) Form a triangle inside the square which has one third of its area.
(c) Use a line to divide the trapezium into two parts having equal area.
(d) Form a triangle inside the given triangle which has one fourth of its area.

建議題解/ Suggested Solutions：

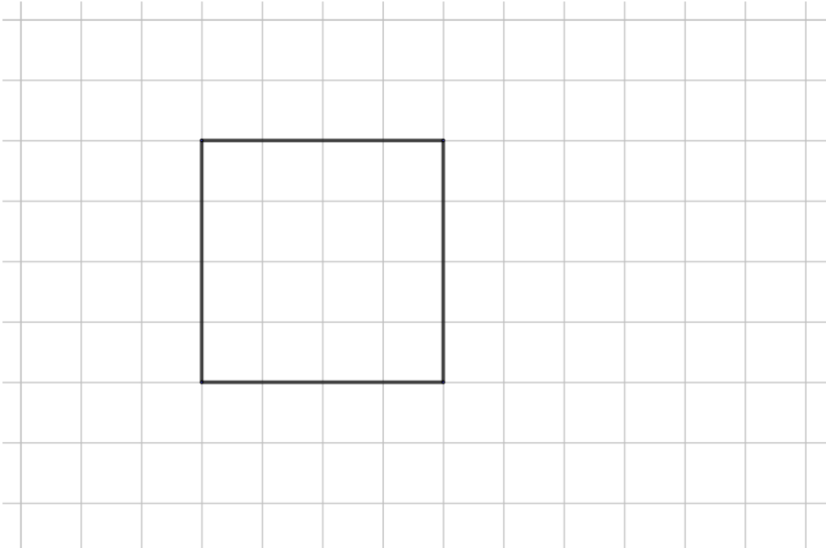
(*接受其他合理答案/Accept any reasonable answers*)

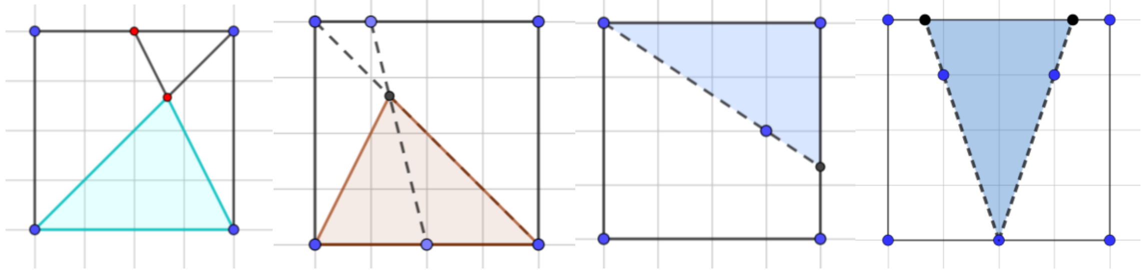
(a)



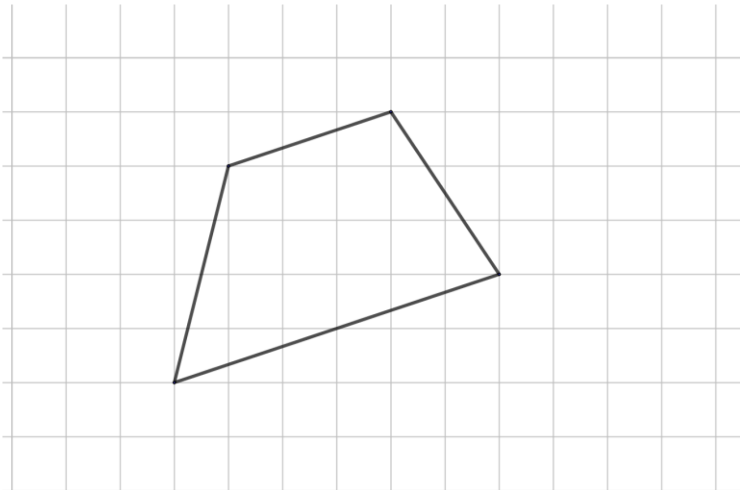


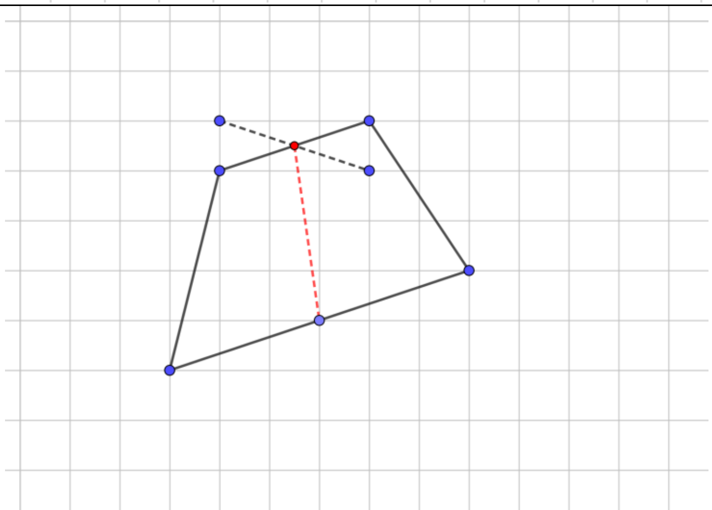
(b)



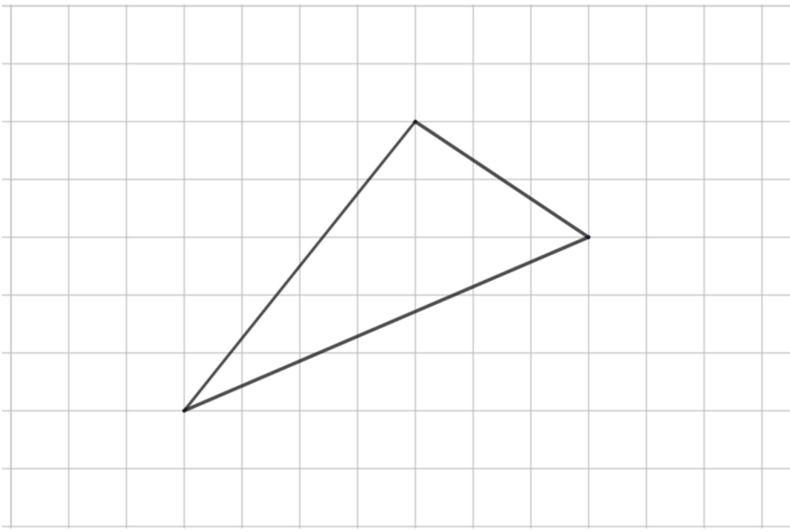


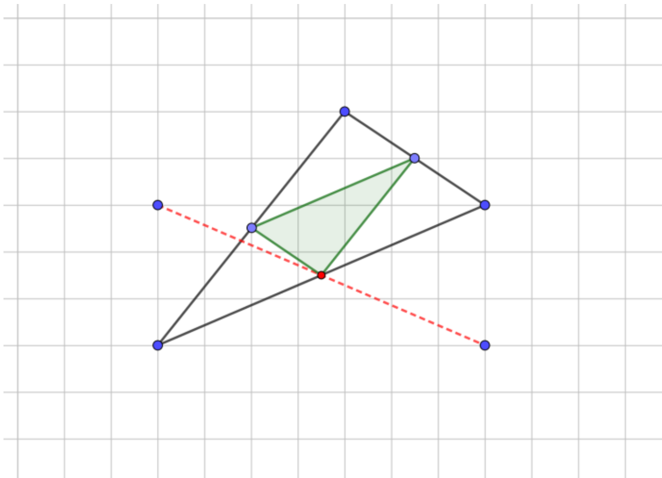
(c)





(d)





z

全卷完

End of Paper