

題 1 (2 分)

2018 可寫成兩個部分的和：第一個部分是某整數的十次方；第二個部分可表達為三個整數的積。求這三個整數。

[註： a 的十次方意思為 $a^{10} = a \times a \times a \times a \times a \times a \times a \times a \times a \times a$]

答：

Question 1 (2 marks)

2018 can be expressed as the sum of two parts. The first part is the tenth power of a whole number and the second part equals to the product of 3 whole numbers. Find these three whole numbers.

[Note: The tenth power of a means $a^{10} = a \times a \times a \times a \times a \times a \times a \times a \times a \times a$]

Answer:

題 2 (2 分)

已知 N 是一個 4 位數，它由 4 個不同的數字組成，且 N 可被 27 整除。

求 N 的最小可能值。

答： N 的最小可能值是 _____。

Question 2 (2 marks)

It is given that N is a 4-digit number made up of 4 different numerals. N is also divisible by 27.

Find the least possible value of N .

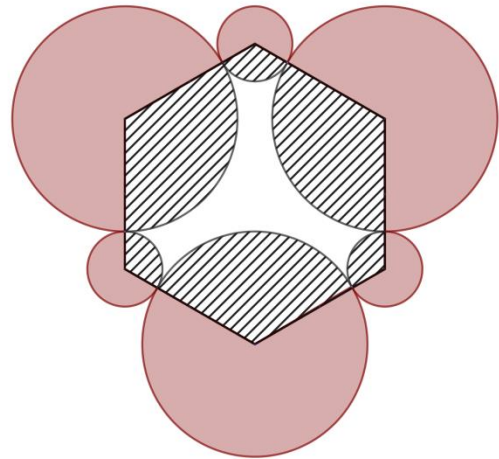
Answer: The least possible value of N is _____.

題 3 (2 分)

圖三中正六邊形的邊長為 4 厘米，六個圓形的圓心分別在正六邊形的頂點上。

如小圓的半徑為 1 厘米，求斜線部分和實色部分面積的比。

答：斜線部分面積：實色部分面積 = ____:____



圖三 / Figure 3

Question 3 (2 marks)

Figure 3 shows a regular hexagon with side 4 cm. The centres of the six circles are located at the six vertices of the hexagon. If the radius of the small circles are all 1 cm, find the ratio of the area of the shaded parts to the area of the solid parts.

Answer: Area of the shaded parts : Area of the solid parts = ____:____

題 4 (2 分)

小智和小光由和諧鎮步行到日之城。小智早一小時出發，小光早一小時到達。如果小智的步行速度是 5 公里/小時，小光的步行速度是 6 公里/小時，求兩地的距離。

答：和諧鎮和日之城相距 _____ 公里。

Question 4 (2 marks)

Adam and Bill walked from Town of Peace to Sunshine City. Adam started an hour earlier while Bill arrived an hour earlier. If the walking speed of Adam was 5 km/h while the walking speed of Bill was 6 km/h. Find the distance between the two places.

Answer: The distance between Town of Peace and Sunshine City is _____ km.

題 5 (2 分)

小樂由南向北行走，不久她向右轉 90° 行走，又過不久向左轉 270° 行走，最後向後轉走，請問這時小樂是朝哪一個方向行走？

答：

Question 5 (2 marks)

Joyce started walking towards the north for a certain time. After a while, she turned 90° to the right and continued to walk. After some time, she turned 270° to the left and continued to walk. Finally, she turned back and walked. Which direction was Joyce walking towards finally?

Answer:

題 6 (2 分)

三個質數之和是 132。如果最大的數比中間的數大 48，請找出這三個質數。

答：

Question 6 (2 marks)

The sum of 3 different prime numbers is 132. If the greatest number exceeds the middle number by 48, find the 3 prime numbers.

Answer:

題 7 (3 分)

有一個長方體盒子，它的底部是正方形，體積是 288 立方厘米。已知盒子的長、闊、高都是整數厘米。

- (a) 請列出盒子其中一種可能的尺寸。
- (b) 請問這個盒子可能有多少種不同的尺寸？

答：

(a)

(b)

Question 7 (3 marks)

There is a rectangular box and its base is a square. Its volume is 288 cm^3 . It is given that the length, width and height in cm are all integers.

- (a) List one possible dimension of the box.
- (b) How many possible dimensions of the boxes are there?

Answer:

(a)

(b)

題 8 (2 分)

盒子裏有一些波子。爸爸取去一半多兩粒，媽媽再取去餘下的一半多三粒。之後弟弟再取去餘下的 $\frac{1}{4}$ ，最後只剩下 3 粒波子。請問盒子裏原有波子多少粒？

答：

Question 8 (2 marks)

There are some marbles in a box. Father takes half of them and 2 more, then mother takes half of the marbles left and 3 more. Then little brother takes $\frac{1}{4}$ of the marbles left and finally there are 3 marbles left in the box. How many marbles are there originally?

Answer:

題 9 (2 分)

在星球 X，當地人的數數目方法有點不同。我做了一個對照十進制及星球 X 數字的表(由十進制數字 1 至 15)。

十進制數字	1	2	3	4	5	6	7	8	9	10
星球 X 數字	!	@	#	\$	%	!*	!!	!@	!#	!\$

十進制數字	11	12	13	14	15
星球 X 數字	!%	@*	@!	@@	@#

原先在我的口袋中，我有 ## 粒石頭。我在星球 X 的朋友亦給了我 ## 粒石頭，請問最後我會有多少粒石頭呢？

請以星球 X 的數字來表示你的答案。

答：

Question 9 (2 marks)

In Planet X, the people there count numbers in a different way. I have made a table for comparing the decimal number and Planet X's number (from decimal number 1 to 15).

Decimal Number	1	2	3	4	5	6	7	8	9	10
Planet X Number	!	@	#	\$	%	!*	!!	!@	!#	!\$

Decimal Number	11	12	13	14	15
Planet X Number	!%	@*	@!	@@	@#

There are ## pieces of stone in my pocket originally. My friend from Planet X also gives me ## pieces of stones. How many pieces of stones shall I have finally?

Please use number system in planet X to express your answer.

Answer:

題 10 (2 分)

有一串數列，形成的方法如下：分子為由 1 開始的連續奇數之和，分母為由 2 開始的連續偶數之和，第一個數的分子分母均有 1 項，第二個數的分子分母均有 2 項，如此類推。同學可參考下表

	數列
第一個	$\frac{1}{2}$
第二個	$\frac{1+3}{2+4}$
第三個	$\frac{1+3+5}{2+4+6}$

如果第 N 個數的數值為 0.999，求 N 。

答：

Question 10 (2 marks)

A sequence is formed in the following way: the numerator is the sum of the consecutive odd number(s) starting from 1; the denominator is the sum of the consecutive even number(s) starting from 2. In the first number, there is 1 term in both numerator and denominator. In the second number, there are 2 terms in both numerator and denominator. You can refer to the following table for reference.

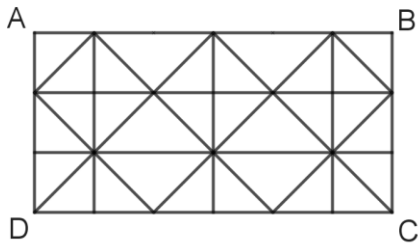
	Sequence
First Number	$\frac{1}{2}$
Second Number	$\frac{1+3}{2+4}$
Third Number	$\frac{1+3+5}{2+4+6}$

If the value of the N^{th} number is 0.999, find N .

Answer:

題 11 (2 分)

下圖中與 $ABCD$ 相似的長方形(除了長方形 $ABCD$ 之外)共有多少個?



答:

Question 11 (2 marks)

How many rectangles are there in the figure which are similar to $ABCD$ (excluding $ABCD$)?

Answer:

題 12 (2 分)

一個新的品種細菌 X 在今天 (第 1 天) 誕生了。它每 24 小時可以把自己複製一次。請指出在第幾天的時候, 這種細菌 X 的數量最接近 2,000,000。

答案:

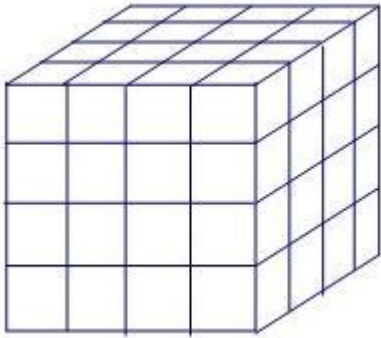
Question 12 (2 marks)

A new kind of bacteria X is born today (Day 1). It duplicates itself by every 24 hours. At which day will the number of bacteria be closest to 2,000,000?

Answer:

題 13 (2 分)

有 64 個表面全為白色的小正方體積木，並拼成表面全為白色的 $4 \times 4 \times 4$ 正方體(圖十三)。現有人故意把某些小正方體的面塗上黑色。最少要把多少個小正方體完全塗上黑色，才能肯定無法透過重新調配，令 $4 \times 4 \times 4$ 的正方體表面不顯露任何黑色呢？



圖十三 / Figure 13

答：

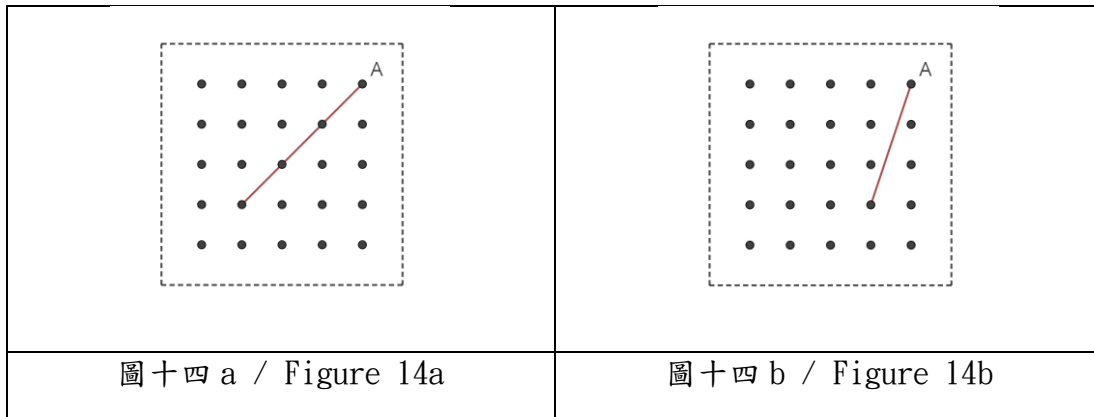
Question 13 (2 marks)

There are 64 small cubes all painted in white and are arranged to a larger white cubes $4 \times 4 \times 4$ in dimension (Figure 13). Some faces of these small cubes have been painted in black. Find the least number of cubes that should be totally painted in black to ensure that it is not possible to hide all the black faces on the $4 \times 4 \times 4$ white cubes by any rearrangements.

Answer:

題 14 (4 分)

在一塊 5X5 的釘板上，你可以用橡皮筋連上兩口釘形成一條線段。有些線段會穿過其他釘，如圖十四 a；有些則不會，如圖十四 b：



- (a) 如果所有橡皮筋的其中一端都必須連上右上角最頂端的釘 A，請問可以連成多少條不會穿過其他釘的不同線段呢？
- (b) 如果現在可以自由選擇釘板上某一點，而所有的橡皮筋的其中一端都必須連上這一點，請問最多可以連成多少條仍然不會穿過其他釘的不同線段呢？

答：

- (a)
- (b)

Question 14 (4 marks)

On a 5x5 geoboard, you can connect 2 dots to form a line segment by using a rubber band. Some line segments will cross over other dots, as shown in Figure 14a. Some line segments will not cross any of the other dots, as shown in Figure 14b.

- (a) If all the line segments must be connected to the upper rightmost dot A. How many possible different line segments can be formed if they cannot cross over any other dots?
- (b) Now you can choose another dot on the geoboard and all the line segments formed must be connected to this new dot. What is the maximum possible different line segments that can be formed if they cannot cross any of the other dots as well?

Answer:

- (a)
- (b)

題 15 (4 分)

一個三角形最多有 1 個直角，一個四邊形最多有 4 個直角。

- (a) 請畫一個有 3 個直角的六邊形。
- (b) 請畫一個有最多個直角的不對稱八邊形。

答：

Question 15 (4 marks)

A triangle can have at most 1 right angle and a quadrilateral can have at most 4 right angles.

- (a) Please draw a hexagon with 3 right angles.
- (b) Please draw a non-symmetric octagon with the greatest number of right angles.

Answer:

題 16 (4 分)

阿良有一部很基本的計算機，只有簡單功能及只能展示答案在單行的液晶顯示屏上。它只能進行加、減、乘及除的四則運算。所有計算都是順序的，當你輸入「+」、「-」、「×」、「÷」或「=」鍵後，答案會立刻出現。例子如下：

鍵入次序	最後屏幕展示
$1 \times 2 + 3 - 4 \times 5 + 6 =$	11
$1 + 2 + 3 \times 4 \times 5 - 6 =$	114
$1 \times 2 \times 3 + 4 - 5 \times 6 =$	30

有一天，阿良發現他的計算機大部份按鍵都損壞了，只剩下「3」、「5」、「+」、「-」、「×」及「=」仍然能夠使用。



你可以找出不同的按鍵次序，使計算機最後能出現所需的數字嗎？

- (a) 27
- (b) 38
- (c) 19
- (d) 31

答：

- (a)
- (b)
- (c)
- (d)

Question 16 (4 marks)

John has a very basic calculator that has few functions and displays the results in a one-line LED screen. It can be called a "four-function" calculator since it can only add, subtract, multiply, and divide. All calculations are sequential and the answer will be displayed immediately after you have pressed the "+", "-", "×", "÷" and "=" buttons. Examples are shown below:

Key sequences	Final Display
$1 \times 2 + 3 - 4 \times 5 + 6 =$	11
$1 + 2 + 3 \times 4 \times 5 - 6 =$	114
$1 \times 2 \times 3 + 4 - 5 \times 6 =$	30

One day, John discovers that most of the buttons are damaged and only "3", "5", "+", "-", "×" and "=" buttons are still working.



Can you find out the key sequences so that the calculator will finally display these values?

- (a) 27
- (b) 38
- (c) 19
- (d) 31

Answer:

- (a)
- (b)
- (c)
- (d)

題 17 (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

答: 提供的數字是 _____

Question 17 (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 number will get 0 marks. All the other teams will get 1 mark.

Answer: Number provided is _____

題 18 (4 分)

在不用直尺、不撕開紙張、不繪畫線條的情況下, 把四張 A5 紙分別摺成

- (a) 正方形、
- (b) 菱形、
- (c) 平行四邊形、
- (d) 鶴形

答: (把摺好的四邊形放入文件夾內)

Question 18 (4 marks)

Without using ruler, tearing of paper and drawing any line, fold the four pieces of A5 paper, respectively, into

- (a) A square,
- (b) A rhombus,
- (c) A parallelogram,
- (d) A kite

Answer: (put the folded quadrilaterals into the folder)

全卷完 [End of Paper]