

請將答案寫在 答題紙 上。

All answers should be written on the ANSWER SHEET.

甲部：每題 4 分

Section A – each question carries 4 marks

- 1) 將一個正方形的每條邊長各增加百分之十五，問面積增加了百分之幾？
Increase the length of each side of a square by 15%. By how many percent is the area increased?
- 2) 甲廠每 2 天可生產 $(3x-10)$ 件產品，乙廠每 5 天可生產 $(7x+4)$ 件產品。已知兩廠 10 天可生產相同數量的產品，求 10 天兩廠合共生產產品的數目。
Factory A can produce $(3x-10)$ products every 2 days. Factory B can produce $(7x+4)$ products every 5 days. Given that the two factories can produce the same number of products in 10 days, find the number of products that the two factories can produce in 10 days.
- 3) 有一個六位數，它的個位數字是 1，如果把這個 1 移到這個數的首位，得到的新數是原數的三分之一。求原來的六位數。
The units digit of a six-digit number is 1. If this 1 is moved to the first place of this number, the new number obtained is one-third of the original number. Find the original six-digit number.
- 4) 有一個「時鐘」，鐘面上有 20「小時」（而非 12 小時），而每小時有 45「分鐘」（而非 60 分鐘）。當鐘面顯示「7 時 30 分」時，求時針與分針所形成的較小夾角。
A "clock" has 20 "hours" (rather than 12) on its face and 45 "minutes" (rather than 60) for each hour. When the clock shows 7:30, find the included angle between the hours hand and the minutes hand.
- 5) 設 $A = 0.3 + 0.33 + 0.333 + \dots + \underbrace{0.333\dots33}_{10 \text{ "3"}}$ ，求 A 的整數部分。
Let $A = 0.3 + 0.33 + 0.333 + \dots + \underbrace{0.333\dots33}_{10 \text{ "3" 's}}$. Find the integral part of A .
- 6) 試化簡 $\frac{312}{507}$ 。
Simplify $\frac{312}{507}$.
- 7) 舞會中共有 20 對夫妻，每人都與自己伴侶以外的所有人握手，問一共握了多少次手？
There are 20 couples in a ball. Each person shakes hands with anyone other than his/her spouse. How many times of hand-shaking have occurred?
- 8) 若某 8 個連續奇數之和是 2016，求當中最大的數。
If the sum of 8 consecutive odd numbers is 2016, find the largest number among them.

~ 甲部完 ~
~ End of Section A ~

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乙部：每題 5 分

Section B – each question carries 5 marks

- 9) 在「平面直角坐標系」中，將 $A(-4,5)$ 沿原點逆時針旋轉 270° 至 $B(x,y)$ ，求 $x+y$ 的值。
In the rectangular coordinate plane, rotate $A(-4,5)$ 270° anti-clockwise about the origin to $B(x,y)$. Find the value of $x+y$.
- 10) 在除法算式 $2017 \div (\quad) = (\quad) \dots 7$ 的括號中填上正整數使等式成立，問一共有多少種方法？
How many ways are there to fill in positive integers in the division $2017 \div (\quad) = (\quad) \dots 7$ so that the equality holds?
- 11) 有濃度為 17% 的鹽水 10 升，若要混合出濃度不高於 20%、不低於 15% 的鹽水 18 升，求用以混合的鹽水濃度的最大值和最小值之差。
There is 10 L of salt solution having a concentration of 17%. To mix 18 L of salt solution having a concentration not higher than 20% and not lower than 15%, find the difference between the maximum and the minimum concentration of the salt solution used for mixing.
- 12) 若非負數 a 的平方等於 n ，則稱 a 為「 n 的算術平方根」，記作 \sqrt{n} 。如 $\sqrt{4} = 2$ 、 $\sqrt{12} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$ 。求 $\sqrt{20} \times \sqrt{3} \times \sqrt{12}$ 的值，並化簡為最簡根式。
If the square of non-negative number a is equal to n , then a is called the “principle square root of n ” and denoted by “ \sqrt{n} ”. For example $\sqrt{4} = 2$ and $\sqrt{12} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$. Find the value of $\sqrt{20} \times \sqrt{3} \times \sqrt{12}$ and simplify it to simplest surd.
- 13) 已知 $x = 2.\overset{\cdot\cdot}{0}\overset{\cdot\cdot}{1}\overset{\cdot}{7} - 3.\overset{\cdot}{1}\overset{\cdot}{2}$ ，試以最簡分數表示 x 。
Given that $x = 2.\overset{\cdot\cdot}{0}\overset{\cdot\cdot}{1}\overset{\cdot}{7} - 3.\overset{\cdot}{1}\overset{\cdot}{2}$, express x in simplest fraction.
- 14) 若一直角三角形三邊邊長都是整數，且其中一邊長 8，求最長的一邊的最大長度。
If the side lengths of a right-angled triangle are all integers and the one of the length is 8, find the greatest length of the longest side.
- 15) 求 312 的正因子和。
Find the sum of all positive divisors of 312.
- 16) 若三位數 n 除以 6 和 11 時的餘數分別是 3 和 8，求 n 的可能值之和。
If the remainder of a three-digit number n divided by 6 and 11 is 3 and 8 respectively, find the sum of all possible values of n .

~ 乙部完 ~

~ End of Section B ~

請以最簡形式填寫答案。若計算結果是分數，請化至最簡，並確保為真分數或帶分數，或將計算結果寫成小數。

答案可以根式表示，唯該根式必須是最簡形式。除特別註明外，毋需填寫單位。錯誤單位將不給予任何分數。

Write down the answer in the simplest form. If the calculation result is a fraction, please write down the answer as a proper or mixed fraction, decimal figure is also accepted. You may use square root to represent the answer which is in the simplest form.

Unless otherwise stated, no need to write down any unit. Marks will NOT be given for incorrect unit.

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丙部：每題 7 分

Section C – each question carries 7 marks

17) 試化簡 $\sqrt{596 \times 562 + 289}$ 。

Simplify $\sqrt{596 \times 562 + 289}$.

18) 圖 18 是一國際象棋的棋盤，若從中選取正方形，問一共有多少個正方形包含奇數數目的黑色格子？
Figure 18 is a chessboard. If squares are selected from the figure, how many squares embrace odd number of black grids are there?

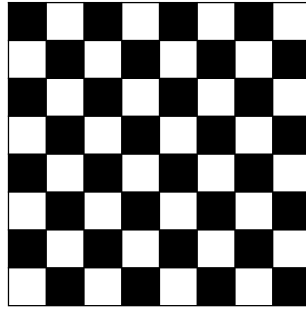


圖 18

Figure 18

19) 若一自然數 n 有 3 個不同的質因子，且 n 的正因子之和是 312，求 n 的值。

If a natural number n has 3 different prime divisors and the sum of all positive divisors of n is 312, find the value of n .

20) 如果某正整數可被質因分解成兩個質數之積，我們便稱它為「好數」；若連續 n 個正整數都是「好數」，則為「 n 好數組」。例如：(14,15)、(21,22) 都是「2 好數組」。求 n 的最大值。

If a positive integer can be factorized as the product of two prime numbers, we call it a “good number”. If n consecutive positive integers are good numbers, then they are a “group of n good numbers”. For example: (14,15)、(21,22) are both “groups of 2 good numbers”. Find the largest possible value of n .

~ 全卷完 ~

~ End of Paper ~