MathConception 2022

S1

Question Booklet 問題簿

Name:
姓名：

Reg. No.:
登記編號：

Time: 1 hour
Calculators are NOT permitted.

Instructions:

1. DO NOT OPEN THIS QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Write your name and registration number on the cover of this question booklet.
3. If the information printed on your answer sheet is not correct, please inform the invigilator immediately.
4. Please use a pencil and write your answers neatly ONLY on the answer sheet provided. DO NOT write or draw in the circle next to each answer box. No mark will be given if you failed to follow this instruction.
5. Unless otherwise specified, all answers must be in exact value and in its simplest form. Writing the units for the answers is NOT necessary.
6. Rough-work sheets provided will be collected at the end of the contest but they will not be marked.
7. Diagrams in this question booklet are not necessarily drawn to scale.

限時：1 小時
不允許使用計算機。

比賽須知：

1. 未宣布開始前，切勿翻閱此問題簿。
2. 請在此問題簿封面的適當位置寫上你的姓名及登記編號。
3. 請核對答題紙上列出的資料是否與你相符。如有問題，請舉手。
4. 所有答案必須寫在答題紙內，並須用鉛筆作答。請勿填寫或畫花題號後方的圓圈，否則該題答案將會作廢。
5. 除非題目特別表明，所有答案均不需填寫單位，但必須以準確數值及最簡方式表示。
6. 比賽完結時監考員會收回桌上的草稿紙，但草稿紙上所書寫的任何文字或圖表將不獲評閱。
7. 此問題簿的附圖不一定依比例繪成。

1) It is known that P is 0.4 times of Q, how many times is Q of P? [3%]

已知 P 是 Q 的 0.4 倍，那麼 Q 是 P 的多少倍？

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2) The general term T_n of a sequence is $\dfrac{(n-1)(n-2)}{(n+1)(n+2)}$. Find the 9th term in the sequence. Express the answer in its simplest fraction. [3.1%]

一個數列的通項是 $\dfrac{(n-1)(n-2)}{(n+1)(n+2)}$。求該數列的第 9 項，並以最簡分數表示答案。

3) Expand $(x-5)(x^2-1)(x+5)$ in descending order. [3.2%]

展開 $(x-5)(x^2-1)(x+5)$，並以降冪法排列。

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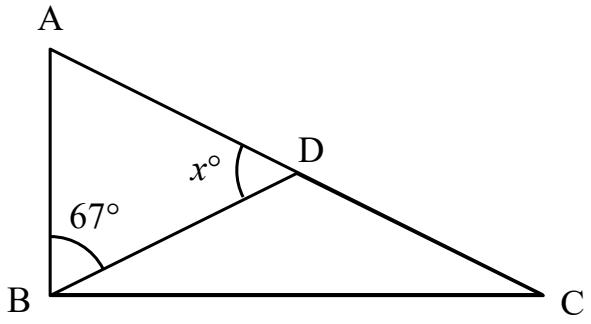
4) Simplify $\dfrac{2022}{5729}$ to its simplest form. [3.3%]

化簡 $\dfrac{2022}{5729}$ 至最簡分數。

5) In the figure, ΔABC is a right-angled triangle and DB = DC. Find the value of x. [3.4%]

圖中ΔABC 是一個直角三角形，而 DB = DC。求 x 的值。



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6) Find the sum of all positive factors of 2022. [3.5%]

求 2022 的所有正因數之和。

7) It is known that $4x^{a+b}+2y^{c-b}-z^{a-c}=8$ is a linear equation with three unknowns. Find the value of b. [3.6%]

已知 $4x^{a+b}+2y^{c-b}-z^{a-c}=8$ 是三元一次方程，求 b 的值。

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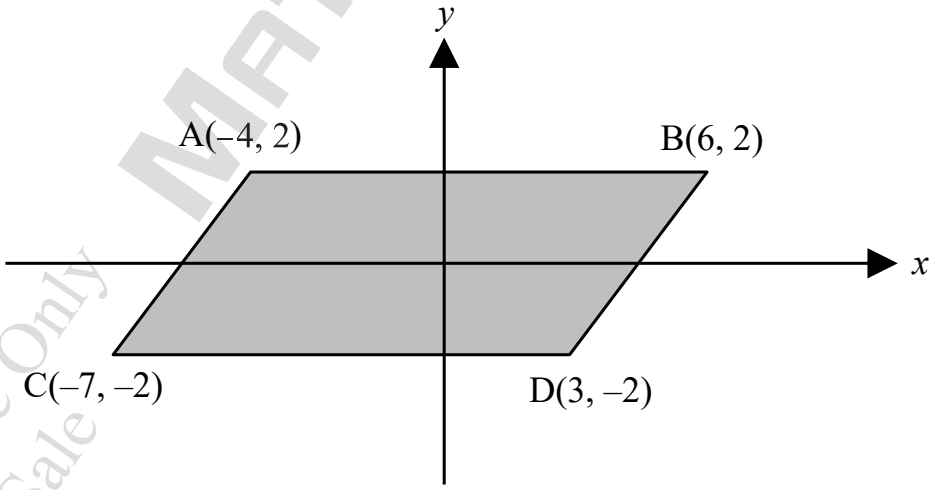
8) Find the perimeter of the parallelogram ABCD. [3.7%]

求平行四邊形 ABCD 的周界。



9) The ratio of the exterior angles of a convex nonagon is $1:2:3:4:5:6:7:8:9$. If the largest interior angle of the nonagon is $x°$, find the value of x. [4.8%]

一個凸九邊形的外角比為$1:2:3:4:5:6:7:8:9$。如果該九邊形最大的內角是$x°$，求x的值。

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10) Find the value of $2.\dot{0}2\dot{2}+1.\dot{2}\dot{3}$ and show your answer in recurring decimals. [4.9%]

求$2.\dot{0}2\dot{2}+1.\dot{2}\dot{3}$的值，並以循環小數表示答案。

11) In a monomial a^2b, the value of a decreased by 20% and the value of b increased by 40%. If the percentage of the new value of the monomial to its original value is x%, find the value of x. [5.1%]

在單項式 a^2b 中，a 的值減少了 20%，而 b 的值增加了 40%。如果單項式的新值是原值的百分之 x，求 x 的值。

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12) Find the H.C.F. of 2022 and 211. [5.2%]

求 2022 和 211 的最大公因數。

13) Find the units digit of $3^{2022}+8^{2022}$. [6.3%]

求 $3^{2022}+8^{2022}$ 的個位值。

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14) Find the value of $4^3+8^3+12^3+...+36^3$. [6.4%]

求 $4^3+8^3+12^3+...+36^3$ 的值。

15) Find the value of $\frac{1}{4}-\frac{1}{16}+\frac{1}{64}-\frac{1}{256}+...+\frac{1}{16384}$. [6.5%]

求 $\frac{1}{4}-\frac{1}{16}+\frac{1}{64}-\frac{1}{256}+...+\frac{1}{16384}$ 的值。

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16) What is the remainder when the 2020-digit number 20222022…2022 is divided by 7? [6.6%]

當 2020 位數 20222022…2022 除以 7 時，餘數是多少？

17) It is given that a, b are two positive integers and $a^2 - b^2 = 839$. Find the value of b. [6.7%]

已知 a, b 為兩正整數，且 $a^2 - b^2 = 839$。求 b 的值。

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18) If an arithmetic sequence has at least three terms, the first term must be 1 and the last term must be 2022, and all terms are integers. Find the sum of all terms of all the sequences that fits the above requirements. [6.8%]

若一等差數列最少有 3 項，首項必為 1，末項必為 2022，而所有項均為整數。求所有符合條件的數列的數列和之和。

19) Simplify $\frac{919687}{4080553}$ to its simplest form. [6.9%]

化簡 $\frac{919687}{4080553}$ 至最簡分數。

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20) Find the value of $\sqrt{4190209}$. [7%]

求 $\sqrt{4190209}$ 的值。

End of paper
全卷完

MATH 數學·思維大激鬥 CONCEPTITION

REG NO			S1
NAME			
GROUP			
SEAT			

ANSWER SHEET

	ANSWER			ANSWER	
1	2.5		11	89.6	
2	$\frac{28}{55}$		12	1	
3	$x^4 - 26x^2 + 25$		13	3	
4	$\frac{6}{17}$		14	129600	
5	46		15	$\frac{3277}{16384}$	
6	4056		16	6	
7	$-\frac{1}{2}/-0.5$		17	419	
8	30		18	2138311	
9	172		19	$\frac{103}{457}$	
10	$3.\dot{2}5434\dot{5}$		20	2047	