1) If $2^x = 4$ is given, work out $\frac{8^x}{4} + \frac{32^x}{64}$

如果 $2^x = 4$, 計算出 $\frac{8^x}{4} + \frac{32^x}{64}$

A) 48 **B)** 64
C) 33 **D)** 32

2) Solve this equation解這個方程

$$\frac{1}{x+1} - \frac{5}{x-1} = \frac{2}{x^2-1}$$

A) -2 **B)** 1
C) 3 **D)** 2,5

2) How many elements of the set $\{1, 2, 3, \ldots \ldots, 61\}$ divisible by 4 or 7 ?
集合 {1,2,3,…….,61} 中有多少元素可以被 4 或 7 整除？

A) 14 **B)** 21
C) 22 **D)** 30

3) Assuming $a \neq 5, b \neq 6$, and $c \neq 7$, what is the value in the simplest form of the following expression?
假設a≠5，b≠6和c≠7，以下表達式的最簡單形式的值是多少？

$$\frac{a-3}{7-c} \cdot \frac{b-6}{3-a} \cdot \frac{c-7}{6-b}$$

A) 1 **B)** $\frac{abc}{60}$
C) – 1 **D)** a

5) The sum of the digits of n is written $S(n)$. For example
$S(7) = 7$ *and* $S(2024) = 2 + 0 + 2 + 4 = 8$

n 的數字之和記為 S(n)。 例如

S(7)=7 和 S(2024)=2+0+2+4=8

This notation can be written multiple times for example

$$S(S(59)) = S(5+9) = S(14) = 1 + 4 = 5$$

Which of the following has $S((n)) = 9$

例如，這個符號可以寫多次

S(S(59))=S(5+9)=S(14)=1+4=5

下列哪項的 S((n))=9

A) 1534 **B)** 1857
C) 1898 **D)** 1962

6) What is the 2023rd letter in this sequence?

這個序列中的第2023^{rd} 個字母是什麼？
AMCEFCMAAMCEFCMAAMCEFCMAAMCEFCMA ……

A) A **B)** E
C) C **D)** M

7) Solve求解: $4^3 - 3^2 + 5^3 + 8^2 = ?$

A) 244 **B)** 444
C) 458 **D)** 284

8) What is the value of 值是多少
9,000,000 – 900,000 + 9,000 – 900 + 90 –9 =?

A) 8108181 **B)** 8181081
C) 818181 **D)** 8181810

9) Find找出 $\sqrt{2}$ x a = ?

$$1 + a + \frac{1 + \frac{1 + \frac{1}{a}}{a+1}}{\frac{1}{a}} = 4$$

A) 1 B) $\sqrt{2}$
C) $\sqrt{3}$ D) 2

10) Find the value of y + z – x =?
求y + z – x =?

$$\left.\begin{aligned} xy &= z + 4 \\ zx &= y + 6 \\ z &= 5 - y \end{aligned}\right\}$$

A) 4 **B)** 0,5
C) 3 **D)** 2

11) Solve求解:

$$\log_6 12 = x \Rightarrow \log_{12} 24 = ?$$

A) $\frac{2x-1}{x+1}$ **B)** 1
C) $\frac{2x-1}{x}$ **D)** $\frac{x-2}{x}$

12) Find the value of A x B =?
求 A x B =?

$$A = \frac{3}{3 + \frac{1}{7}}, \quad B = \frac{3}{1 - A}$$

A) 42 **B)** 52
C) 63 **D)** 66

13) Simplify: 簡化：

$$\frac{a^2b - 3a^2 - 3a + ab - 2b + 6}{ab^2 + 2b^2 - 10b - 5ab + 6a + 12} + \frac{1}{b-2} = ?$$

A) $\frac{a-1}{b-2}$ **B)** $\frac{a}{b-2}$
C) $\frac{1}{b+2}$ **D)** a

14) Find the value of $\frac{3A}{\sqrt{5}} = ?$
求出$\frac{3A}{\sqrt{5}} = ?$

$$A = \frac{\sqrt{15}}{3} - \sqrt{9 - \frac{1}{9}} + \frac{\sqrt{405}}{27}$$

A) $\sqrt{3} - 3$ **B)** $1 - \sqrt{3}$
C) $\sqrt{3} - 1$ **D)** $2\sqrt{3}$

15) Find the value of 2x + y – 2z =?
求出 2x + y – 2z =?

$$\left.\begin{aligned} x+2y+3z&=7\\ x+3y&=5\\ 3y+4z&=7 \end{aligned}\right\}$$

A) 4 **B)** 0
C) 3 **D)** 6

16) Simplify: 簡化：

$$\frac{\cos x}{1+\sin x}+\tan x=?$$

A) $\cos x$ **B)** $\cot x$
C) $\sin x$ **D)** $\frac{1}{\cos x}$

17) Find the value of A+B+C+D=?
找 A+B+C+D= 的值

$$\begin{array}{r} \mathbf{A\ B\ C} \\ +\ \mathbf{B}\ 8\ \mathbf{D} \\ \hline 8\ \mathbf{D}\ 0 \end{array} \qquad \begin{array}{r} 8\ \mathbf{B\ D} \\ -\ \mathbf{A\ C\ B} \\ \hline \mathbf{B\ B}\ 9 \end{array}$$

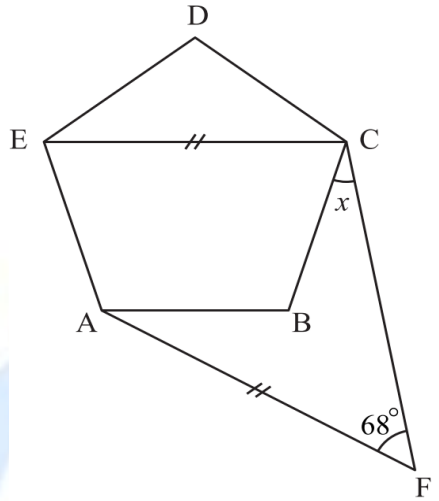
A) 16 **B)** 17
C) 18 **D)** 20

18) What is the next number?
下一個數字是多少？

2, 5, 10, 17, 26, 37, …

A) 45 **B)** 50
C) 53 **D)** 49

19) ABCDE is a regular pentagon,
ABCDE是正五邊形，



$|EC|=|AF|$

$m(\widehat{AFC})=68^\circ$

$m(\widehat{BCF})=x=?$

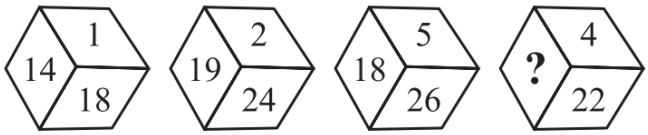
A) 30 **B)** 32
C) 40 **D)** 36

20) Solve: 求解:

$$\left(\frac{2}{\sqrt{3}-1}+\frac{3}{\sqrt{3}-2}+\frac{15}{3-\sqrt{3}}\right)\cdot\left(2\sqrt{3}+10\right)^{-1}=?$$

A) 4 **B)** 1
C) $\frac{1}{2}$ **D)** $\frac{1}{4}$

21) Find the missing number.
找丟失的號碼。



Answer答案: _____

22) Find the greatest value of x.
找x 的最大值。

$$\left(\frac{x+3}{x-1}\right)^2+12=64\left(\frac{x-1}{x+3}\right)^2$$

Answer答案: _____

23) Solve: 求解:

Answer答案: _____

24) Evaluate求解:

$$2\left(1+\frac{1}{2}\right)+3\left(1+\frac{1}{3}\right)+4\left(1+\frac{1}{4}\right)+\cdots+20\left(1+\frac{1}{20}\right)=?$$

Answer答案: _____

25) Let d and e denote the solution of $4x^2+15x-4=0$. What is the value of $4(d-1)(e-1)=?$

假設d和e表示 $4x^2+15x-4=0$
$4(d-1)(e-1)=?$ 的值是多少？

Answer答案: _____