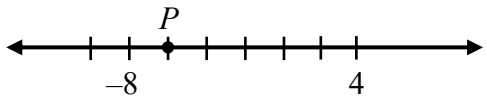
MathConceptition 2019 S1

1) Referring to the following number line, what is the opposite number of P? [3.0%]

根據以下數線，求 P 的相反數。



2) Find the 9th term of the sequence below. [3.1%]

求以下數列中第 9 項的數值。

2, 5, 10, 17, 26, …

3) If A is 50% of B, then B is _____% of A. [3.2%]

若 A 是 B 的 50%，那麼 B 是 A 的_____%。

4) The length of one side of a square is $\frac{3}{4}z-12$. If its perimeter is 36, what is the value of z? [3.3%]

一個正方形的邊長是 $\frac{3}{4}z-12$。如果正方形的周界是 36，求 z。

5) Solve the equation $\frac{1}{4}(u-7)=\frac{1}{3}-\frac{1}{3}(u+6)$. [3.4%]

解方程 $\frac{1}{4}(u-7)=\frac{1}{3}-\frac{1}{3}(u+6)$。

6) A, B, C and D are four different digits. When rounding off the number "A.AB" to 1 decimal place, it becomes "CD.D". Find the number of possible values of B. [3.5%]

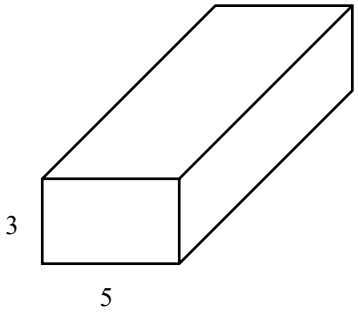
A、B、C 和 D 是四個不同的個位數，取"A.AB"的近似值至小數後一個位會得出"CD.D"。問 B 共有多少個可能值？

7) If the side length of a square is decreased by 30%, the area of the square will be decreased by x%. Find x. [3.6%]

某正方形的邊長減少 30% 後，它的面積會減少 x%。求 x。

8) In the figure, the total surface area of the cuboid is 318. Find the volume of the cuboid. [3.7%]

圖中長方體的表面面積是 318。求它的體積。



9) The reflex angle formed between the hour hand and the minute hand of a clock at 1:30 is $n°$. Find n. [4.8%]

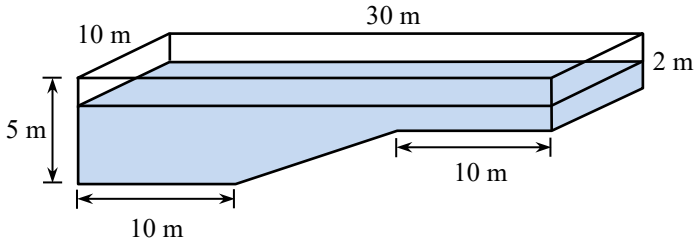
當鐘面顯示的時間是 1:30，時針與分針組成的反角是 $n°$。求 n。

10) Two cars P and Q are 52 km apart. They are travelling in the same direction. The speed of car P is 4 km/h faster than twice that of car Q. If car P catches up with car Q after 30 minutes, find the speed of car Q. [4.9%]

汽車甲和汽車乙相距 52 km，同時向同一方向行駛。汽車甲的速度比汽車乙速度的 2 倍還要快 4 km/h。若汽車甲在行駛 30 分鐘後趕上汽車乙，求汽車乙的速度。

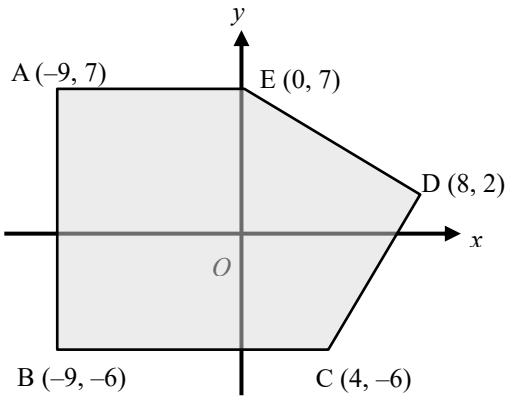
11) The figure shows the dimensions of a swimming pool. If the depth of water is 4 m at the deeper end, what is the volume of the water in the pool? [5.1%]

下圖顯示了一個泳池的大小。若較深水一端水深 4 米，問泳池內水的體積是多少立方米？



12) Find the area of the shaded region. [5.2%]

求著色部份的面積。



13) There are 3 pairs of yellow socks, 4 pairs of blue socks, 5 pairs of white socks and 6 pairs of black socks in a drawer. Two socks are randomly drawn from the drawer each time without replacement. At least how many times are needed to have two socks of the same colour? [6.3%]

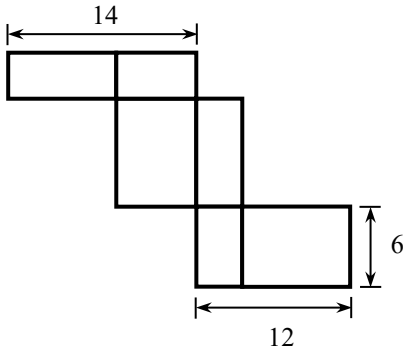
抽屜內有 3 對黃襪、4 對藍襪、5 對白襪和 6 對黑襪。每次從抽屜隨意取出 2 隻襪子，取出後不放回，最少要取多少次才可確保有 2 隻相同顏色的襪子？

14) Given that Shape A has 16-fold rotational symmetry and Shape B has 24-fold rotational symmetry. If Shape C is formed by overlapping Shape A and Shape B together with the same centre, what is the order of rotational symmetry of Shape C? [6.4%]

已知圖形 A 是一個 16 重旋轉對稱圖形，圖形 B 是一個 24 重旋轉對稱圖形。若把圖形 A 和圖形 B 以中心點重疊來組成圖形 C，問圖形 C 是多少重旋轉對稱圖形？

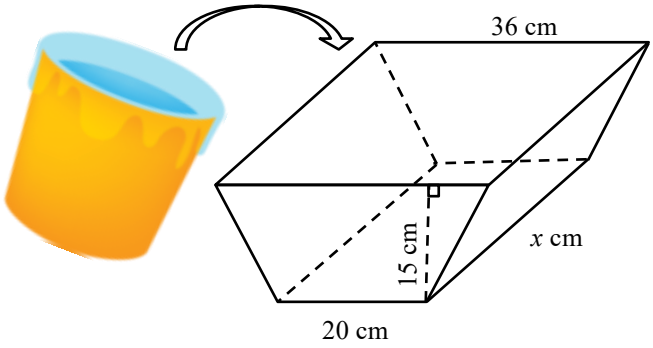
15) Find the volume of the cuboid formed by the net shown below. [6.5%]

求以下摺紙圖形摺成一個長方體後的體積。



16) In the figure, 7200 cm^3 of water is poured into the container whose cross-section is a trapezium. If the height of the water is 7.5 cm, find the value of x. [6.6%]

如圖，若把 7200 cm^3 的水倒入一個梯形柱體的容器後，水的高度是 7.5 cm。求 x。

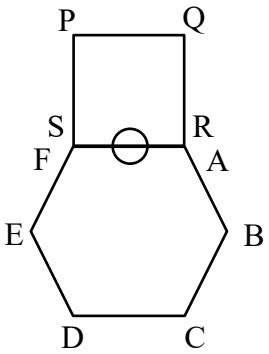


17) There are some marbles in urn A and urn B. The number of marbles in urn A is twice the number of marbles in urn B. If 8 marbles are taken out of urn B and put into urn A, the number of marbles in urn A would become three times the number of marbles in urn B. Find the total number of marbles in the two urns. [6.7%]

袋 A 中彈珠的數目是袋 B 的 2 倍。若從袋 B 取出 8 顆彈珠再放入袋 A，袋 A 中彈珠的數目將會是袋 B 的 3 倍。求袋 A 和袋 B 的彈珠數目之和。

18) The figure below shows a regular hexagon ABCDEF and a square PQRS where SR = FA. There is a semi-circles on the square and a semi-circle on the hexagon as shown. PQRS is rotated clockwise about vertex A until QR coincides with AB. Repeat the process by rotating PQRS clockwise about vertices B, C, D, E, F… until the circle is formed again. What is the total angle of rotation? [6.8%]

圖中 ABCDEF 是一正六邊形，PQRS 是一正方形，SR = FA。如圖顯示，SR 和 FA 上各有一個半圓形。若把 PQRS 以 A 點為中心順時針方向旋轉直至 RQ 和 AB 重疊，再以 B 點為中心順時針方向旋轉直至 QP 和 BC 重疊，如此類推，直到再次形成一個圓形，共需要旋轉 PQRS 多少度？



19) Alan had forgotten his cell phone password. He tried to guess the password and he finally got it right in the 6th attempt. He found out that every attempt he made included 2 correct digits but not in the correct places. What is the 4-digit password needed to unlock the cell phone? [6.9%]

某同學忘記了他手機的 4 位數字密碼，他嘗試了 6 次輸入才能成功把手機解鎖。而他發現頭 5 次的嘗試均有 2 個數字猜中，但位置不對。問該同學手機的正確密碼是什麼？

The 1st attempt 第一次嘗試	8316
The 2nd attempt 第二次嘗試	1684
The 3rd attempt 第三次嘗試	6498
The 4th attempt 第四次嘗試	5239
The 5th attempt 第五次嘗試	4863

20) Find the last two digits of the following sum. [7.0%]

求以下結果的最後兩位數字。

$$\frac{1}{10^{2019}}(1+2+3+...+2019)^{2019}$$

End of paper

MATH 數學·思維大激鬥
CONCEPTITION

REG NO		
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GROUP		
SEAT		

ANSWER SHEET

	ANSWER			ANSWER	
1	6	○	11	750	○
2	82	○	12	185	○
3	200	○	13	3	○
4	28	○	14	8	○
5	$\frac{1}{7}$	○	15	192	○
6	4	○	16	40	○
7	51	○	17	96	○
8	270	○	18	1800	○
9	225	○	19	3941	○
10	100	○	20	79	○