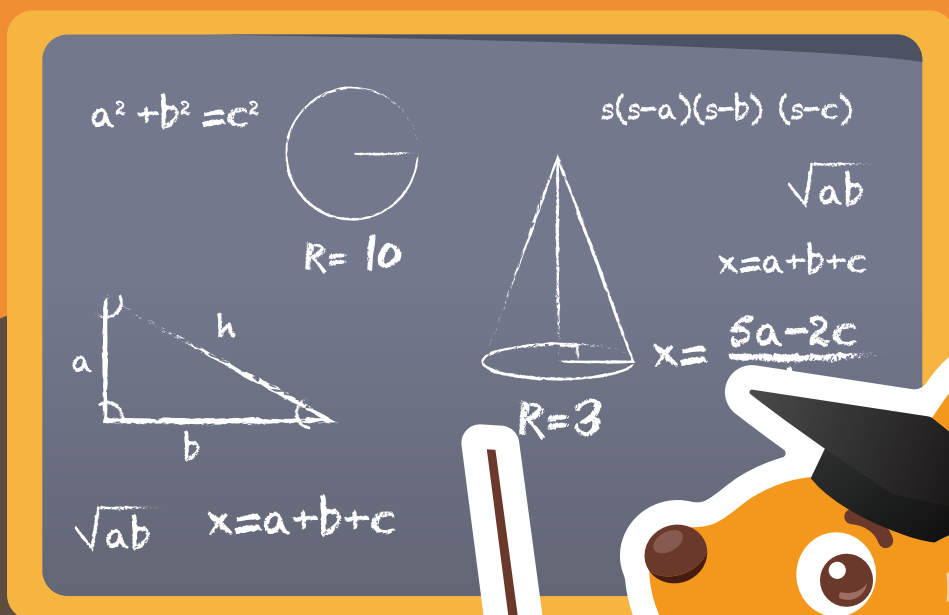


袋鼠数学 Math Kangaroo

样题 (按照知识点)

Sample Questions (By Topic)



$$x = \frac{5a - 2c}{b}$$



Catalog 目录

Algebra 代数函数.....	3
Geometry 空间几何.....	5
Logic 逻辑推理.....	8
Number 数与数论.....	10

Algebra 代数函数

Level A 2023 Q22 Algebra 5 points

Malik places one of the five pieces on the grid. He cannot rotate or flip the pieces.

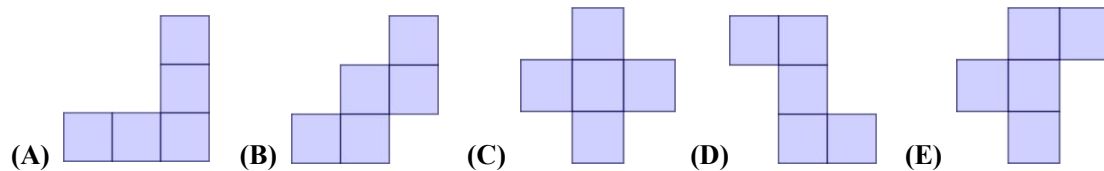
Which piece should he use to cover the numbers with the largest sum?

1	6	7
9	5	4
2	8	3

xiǎo mǎ xiǎng jiāng wǔ gè xuǎn xiàng zhōng de yí gè pīn tú kuài fàng zài yòu
小 马 想 将 五 个 选 项 中 的 一 个 拼 图 块 放 在 右

cè wǎng gé shàng tā bù néng xuán zhuǎn huò fān zhuǎn zhè xiē pīn tú kuài
侧 网 格 上，他 不 能 旋 转 或 翻 转 这 些 拼 图 块。

tā yòng nǎ gè pīn tú kuài fù gài de shù zì zǒng hé zuì dà ?
他 用 哪 个 拼 图 块 覆 盖 的 数 字 总 和 最 大 ？

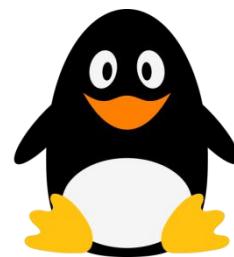


Level B 2024 Q12 Algebra 4 points

Peter the penguin goes fishing every day and brings back 9 fish for his 2 chicks. Each day, he gives 5 fish to the first chick he sees and 4 fish to the second chick, which they eat. Over the last few days, 1 chick has eaten 26 fish. How many fish has the other chick eaten?

企鹅小皮每天都去钓鱼，并为他的 2 只小企鹅带回 9 条鱼。每天，他给自己看到的第一只小企鹅喂 5 条鱼，给第二只喂 4 条鱼。在过去的几天里，有 1 只小企鹅吃了 26 条鱼。请问另一只小企鹅吃了多少条鱼？

- (A) 19 (B) 22 (C) 25 (D) 28 (E) 31



Level D 2024 Q10 Algebra 3 points

The length of a set of four well-parked and fitted supermarket trolleys is 108 cm. The length of a set of ten well-parked and fitted supermarket trolleys is 168 cm. What is the length of a single supermarket trolley?

一排 4 辆整齐停放的超市手推车的长度为 108 cm。一排 10 辆整齐停放的超市手推车的长度是 168 cm。请问一辆超市手推车的长度是多少？

- (A) 60cm (B) 68cm (C) 78cm
(D) 88cm (E) 90cm



Level E 2023 Q9 Algebra 3 points

The letters a and b are to be replaced by positive integers so that the equation is correct. $\frac{a}{5} = \frac{7}{b}$

In how many different ways can this be done?

有多少种不同的方式用正整数代替字母 a 和 b，使得等式成立？

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4
(易错题，正答率 40.90%)

Level F 2023 Q25 Algebra 5 points

Part of the fifth degree polynomial shown cannot be seen because of an inkblot. It is known that all five roots of the polynomial are integers. What is the highest power of $x - 1$ that divides the polynomial?

$$x^5 - 11x^4 + \text{[inkblot]} - 7$$

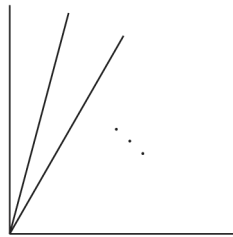
如图所示，一个五次多项式有一部分被墨水遮挡了。已知多项式的五个根都是整数，将该多项式进行分解后得到的 $x - 1$ 的最高次项是什么？

- (A) $(x - 1)^1$ (B) $(x - 1)^2$ (C) $(x - 1)^3$ (D) $(x - 1)^4$ (E) $(x - 1)^5$

Level D 2023 Q19 Geometry 4 points

Angelo drew two lines meeting at a right-angle. What is the smallest number of extra lines he could draw inside his right-angle, as shown, so that for any of the values 10° , 20° , 30° , 40° , 50° , 60° , 70° and 80° , a pair of lines can be chosen with the angle between them equal to that value?

Angelo 绘制了两条相交成直角的线。如图所示，他最少需要在直角内绘制多少条直线，使得度数为 10° , 20° , 30° , 40° , 50° , 60° , 70° 和 80° 的角都可以从其中两条直线的夹角中找到？



- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

(易错题，正答率 23.25%)

Level E 2024 Q24 Geometry 5 points

Jill has some black, gray, and white unit cubes. She uses 27 of them to build a $3 \times 3 \times 3$ cube. She wants the surface to be exactly one-third black, one-third gray, and one-third white. The smallest possible number of black cubes she can use is A and the largest possible number of black cubes she can use is B. What is the value of $B - A$?

Jill 有一些黑色、灰色、白色的单位立方体。她用其中的 27 个立方体构建了一个 $3 \times 3 \times 3$ 的大立方体。她希望这个大立方体的表面上， $\frac{1}{3}$ 为黑色， $\frac{1}{3}$ 为灰色， $\frac{1}{3}$ 为白色。她最少用了 A 个黑色小立方体，最多用了 B 个黑色小立方体。请问 $B - A$ 的值为多少？

- (A) 1 (B) 3 (C) 6 (D) 7 (E) 9

(易错题，正答率 15.40%)

Level F 2024 Q29 Geometry 5 points

Twelve points are equally spaced on a circle. How many triangles containing a 45° angle can be formed by choosing three of these points?

一个圆上有 12 个等距分布的点。选取其中三个点，请问可以组成多少个含一个 45° 角的三角形？

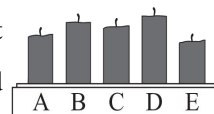
- (A) 48 (B) 60 (C) 72 (D) 84 (E) 96

(易错题, 15.12%)

Logic 逻辑推理

Level B 2023 Q1 Logic 3 points

Akira lits 5 identical candles all at the same time. They stopped burning at different times and now look as shown in the picture. Which candle stopped burning first?



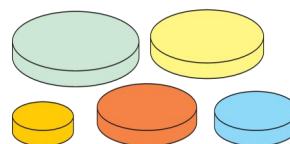
小安将 5 支相同的蜡烛同时点燃。蜡烛在不同的时间停止燃烧，现在看起来如图所示。哪支蜡烛最先停止燃烧？

- (A) A (B) B (C) C (D) D (E) E

(易错题，正答率29.88%)

Level C 2023 Q6 Logic 3 points

Anna has five circular discs of different sizes. She wants to build a tower of four discs so that each disc in her tower is smaller than the disc immediately below it. How many different towers could Anna build?



Anna 有五个大小不同的圆盘。她想用其中四个圆盘建造一座塔，使得塔中的每个圆盘都比紧邻其下方的圆盘小。Anna 可以建造多少座不同的塔？

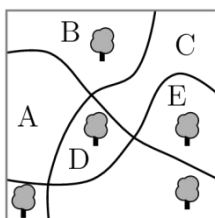
- (A) 4 (B) 5 (C) 9 (D) 12 (E) 20

(易错题，正答率 50.17%)

Level D 2022 Q8 Logic 3 points

There are five big trees and three paths in a park. In which region of the park should a new tree be planted so that for each path, there are the same number of trees on both sides?

公园里有五棵大树和三条小路。请问在公园的哪个区域再种一棵树，可以使得每条小路两侧的树木总数相同？



- (A) A (B) B (C) C (D) D (E) E

(易错题，35.81%)

Level E 2022 Q15 Logic 4 points

Three children asked their grandmother how old she was. She replied by asking them to guess her age. One child said she was 75, one said she was 78 and one said she was 81. It turned out that one of the guesses was wrong by 1 year, one was wrong by 2 years and one was wrong by 4 years. What is the grandmother's age?

三个小孩问他们祖母的岁数。祖母让他们猜猜她的年龄。一个小孩说 75 岁，一个说 78 岁，还有一个说

81 岁。实际上他们都猜错了，一个小孩差了 1 岁，一个小孩差了 2 岁，还有一个小孩差了 4 岁。请问祖母

多大岁数了？

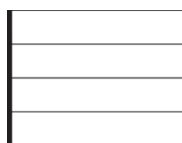
- (A) 76 (B) 77 (C) 79 (D) 80 (E) cannot be determined exactly 无法确定

(易错题，正答率 25.48%)

Level F 2023 Q4 Logic 3 points

Emma has four different coloured pens. She wants to colour the three-striped rectangular flag shown in the diagram so that each stripe is a single colour and no two adjacent stripes are the same colour. In how many ways can she do this?

Emma 有四支不同颜色的笔。她想给图中所示的三横条长方形旗帜涂色，每个横条都涂一种颜色，且相邻条纹的颜色不同。她能用多少种方式给旗帜涂色？



- (A) 24 (B) 27 (C) 32 (D) 36 (E) 64

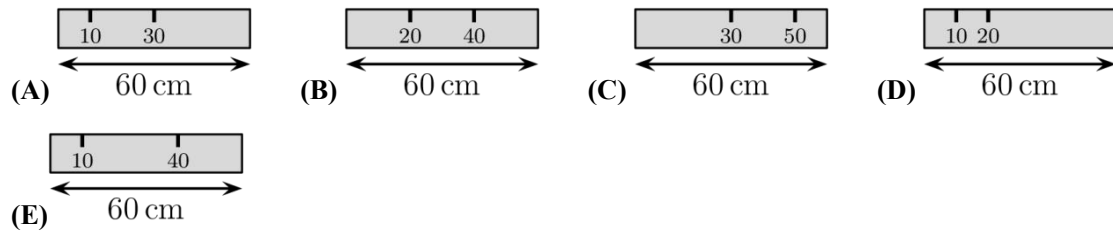
(易错题，正答率 49.72%)

Number 数与数论

Level B 2023 Q11 Number 4 points

Ali has a 60 cm ruler. Unfortunately, some of the markings have faded away. He is able to measure any of the lengths 10, 20, 30, 40, 50 and 60 cm using his ruler only once. Which is Ali's ruler?

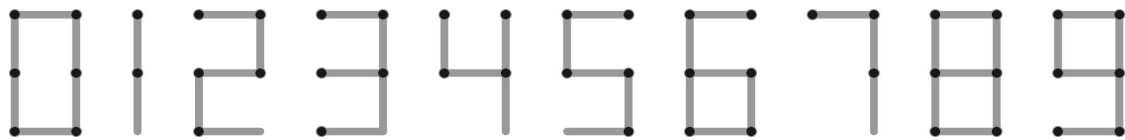
小力有一把 60 cm 的尺子。但尺子上的一些刻度已经看不清了。每次他只用这把尺子量一回，就可以测出 10、20、30、40、50 和 60 cm 中的任意长度。以下哪把是小力的尺子？



(易错题，正答率 19.49%)

Level C 2023 Q2 Number 3 points

Matchsticks can be placed to build numbers, as shown. For example, to build the number 15, one needs 7 matchsticks, and one needs the same number of matchsticks to build the number 8. What is the largest positive number that can be built with seven matchsticks?



如图所示，可以用火柴棍拼成数字。例如，要拼成数字 15，需要 7 根火柴棍，拼成数字 8 需要相同数量的火柴棍。七根火柴棍可以拼成的最大正数是多少？

- (A) 31 (B) 51 (C) 74 (D) 711 (E) 800

Level D 2023 Q11 Number 4 points

Theodorika wrote down three consecutive whole numbers in order, but instead of digits she used symbols so wrote $\square\Diamond\Diamond, \heartsuit\triangle\triangle, \heartsuit\triangle\square$. What would she write next?

Theodorika 按顺序写下三个连续的整数，但是她用符号代替了数字： $\square\Diamond\Diamond, \heartsuit\triangle\triangle, \heartsuit\triangle\square$ 。

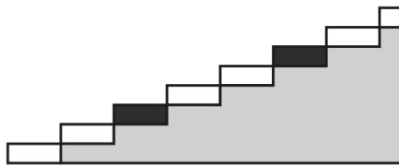
请问下一个数字是什么？

- (A) $\heartsuit\heartsuit\Diamond$ (B) $\square\heartsuit\square$ (C) $\heartsuit\triangle\Diamond$ (D) $\heartsuit\Diamond\square$ (E) $\heartsuit\triangle\heartsuit$

Level E 2023 Q17 Number 4 points

Every third step of a staircase with 2023 steps is coloured black. The first seven steps are shown in the diagram. Anita walks up the steps one at a time, starting with either her right or left foot, alternating each step.

一个楼梯有 2023 级台阶，每过两个台阶就有一个涂黑的台阶，图中显示了前七级台阶。
Anita 左右脚交替，一次走上一级台阶。



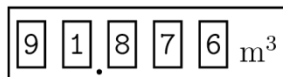
What is the smallest number of black steps she will step on with her right foot?
她的右脚最少踩过多少个黑色台阶？

- (A) 0 (B) 333 (C) 336 (D) 337 (E) 674

Level F 2022 Q11 Number 4 points

When he looks at the water meter in his bathroom, Tony notices that all the digits on the meter are different.

Tony 查看浴室的水表时发现水表上每个数位上的数字都不一样。



How much water will be used until the next time all the digits on the meter are different?

请问水表上各个数位上的数字再次不一样时，已经用完了多少体积的水？

- (A) $0.006m^3$ (B) $0.034m^3$ (C) $0.086m^3$ (D) $0.137m^3$
(E) $1.048m^3$