

2024

AUSTRALIAN MATHEMATICS COMPETITION

AMC.

AMT.
AUSTRALIAN
MATHS TRUST

Level B
Upper Primary
Years 5–6

Information 考试信息

- There are 30 questions: 25 multiple-choice and 5 integer.
本次考试共 30 题，包含 25 道选择题和 5 道答案为整数的填空题。
- You are allowed 60 minutes to do the questions. There is no extra reading time.
考试时长为 60 分钟，无额外读题时间。
- There are no penalties for incorrect answers. You should attempt all questions.
答错不扣分，鼓励学生尝试解答所有问题。
- The questions have been checked thoroughly. Each question is clearly written and no further explanation will be given.
本场考试的所有问题已仔细核查。题目陈述清晰，不提供更多解释。
- Diagrams are not drawn to scale. They are intended only as aids.
图形未按比例绘制，仅供参考。

Competition rules 考试规则

- You must maintain silence at all times.
考试过程中请保持安静。
- Do not open the paper until told to do so.
收到监考老师指示前，请勿打开试卷。
- Mobile phones and smart watches are not allowed. If you have one you must give it to a supervisor, who will store it in a safe place.
禁止使用手机和智能手表。如有携带这些设备，请立刻交与监考老师保管。
- You may use printed language dictionaries.
允许使用纸质语言词典。
- You may use calculators.
允许使用计算器。
- You may not borrow equipment without a supervisor's permission.
未经监考老师许可，禁止向他人借用工具。
- You must not leave your seat during the competition. You must remain seated until the competition finishes.
考试期间禁止离开座位，直到考试结束。
- If you wish to leave the room, a supervisor must accompany you. Raise your hand and wait for a supervisor to come to you.
如需离开考场，必须举手示意并等待监考老师陪同。
- If you have any other questions or problems, raise your hand and wait for a supervisor.
如果有其他问题，请举手示意监考老师。

No student may sit the competition more than once or sit more than one division of the competition. AMT conducts integrity checks on competition results and reserves the right to withhold results or disqualify students if plagiarism or duplicate sittings are suspected.

DATE

28 Sept.

TIME ALLOWED

60 minutes

IMPORTANT

All papers must be immediately returned to a supervisor at the end of the competition.
考试结束后，由监考老师回收所有试卷。

This paper is not for circulation or distribution until Monday 30 September 2024.
在 2024 年 9 月 30 日星期一之前禁止讨论或传播试卷内容。

Upper Primary Division

Questions 1 to 10, 3 marks each

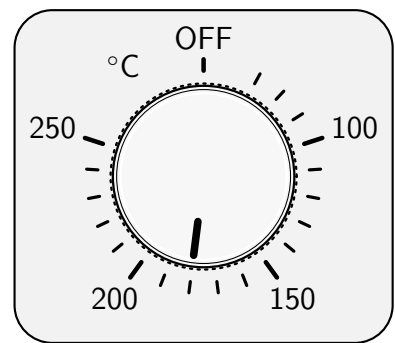
1-10 题, 每题 3 分

1. A square has area 16 cm^2 . What is its perimeter in centimetres?
一个正方形的面积是 16 cm^2 。请问它的周长是多少 cm?
- (A) 4 (B) 8 (C) 12 (D) 16 (E) 24

2. Marlie was born in 2016. In which year will she turn 14?
小玛出生于 2016 年, 请问她将于哪一年迎来她的 14 岁?
- (A) 2026 (B) 2028 (C) 2030 (D) 2032 (E) 2034

3. At a theme park, one ride costs \$8. How many rides can Sally buy with her \$65?
在一个主题公园, 玩 1 次游乐项目需要花费 8 美元。小莎有 65 美元, 请问她可以玩几次游乐项目?
- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

4. Evan set the temperature dial on his oven as shown.
What temperature is it set to?
小伊将烤箱温度调到如图所示的位置。请问他设定的温度是多少?



- (A) 155°C (B) 170°C (C) 180°C (D) 220°C (E) 230°C

5. The following decimals are to be placed in increasing order.
将下列小数按照从小到大的顺序排列。

0.42 0.24 4.02 2.4 0.042

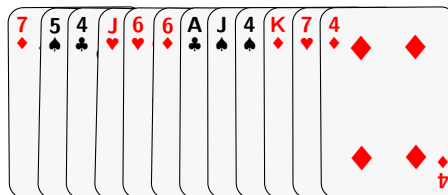
Which number will be in the middle position?

请问排在中间位置的是哪一个数字?

- (A) 0.42 (B) 0.24 (C) 4.02 (D) 2.4 (E) 0.042

6. If I choose one of these cards at random, which of the following am I least likely to get?
 如果我从这些卡牌中随机抽取一张，请问抽到下列哪一张牌的概率最小？

- (A) A four 一张 4
- (B) A seven 一张 7
- (C) A spade ♠ 一张黑桃 ♠
- (D) A heart ♥ 一张红心 ♥
- (E) A diamond ♦ 一张方块 ♦



7. Leila has found out three facts about the speeds of her four favourite fast birds:
 小菜对自己喜欢的 4 种鸟的飞行速度做出以下三个总结：

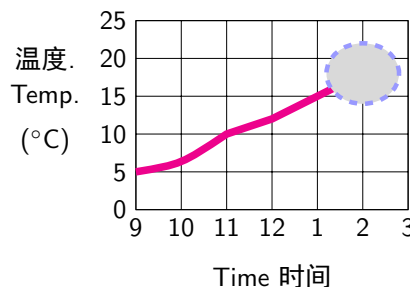
- The spur-winged goose (SWG) is slower than the white-throated needletail (WTN).
 距翅雁 (SWG) 的飞行速度比白喉针尾雨燕 (WTN) 慢。
- The peregrine falcon (PF) is the fastest bird.
 游隼 (PF) 是飞行速度最快的鸟类。
- The frigate bird (FB) is faster than only one of the other birds.
 军舰鸟 (FB) 的飞行速度仅比其他一种鸟类快。

Which of the following lists gives the birds from fastest to slowest?
 请问下列哪个选项将这 4 种鸟类按照其飞行速度从快到慢进行了排序？

- (A) SWG (距翅雁), WTN (白喉针尾雨燕), PF (游隼), FB (军舰鸟)
- (B) PF (游隼), SWG (距翅雁), FB (军舰鸟), WTN (白喉针尾雨燕)
- (C) PF (游隼), WTN (白喉针尾雨燕), SWG (距翅雁), FB (军舰鸟)
- (D) FB (军舰鸟), PF (游隼), WTN (白喉针尾雨燕), SWG (距翅雁)
- (E) PF (游隼), WTN (白喉针尾雨燕), FB (军舰鸟), SWG (距翅雁)

8. This graph shows the temperature throughout the school day, but part of it has been hidden. The hottest part of the day is at 2 pm. What does the missing section of the graph look like?

这张图表记录了某个上学日的气温变化，但部分数据被隐藏了。已知当天下午 2 点的温度最高。请问图中缺失部分呈现怎样的趋势？



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

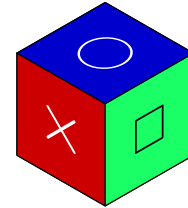
9. In Primeland, they use coins worth \$2, \$3 and \$5. Which of the following totals is **not** possible using exactly 3 coins?

在质数王国，人们使用面额为 2 美元、3 美元和 5 美元的硬币。请问仅用 3 枚硬币无法凑成下列哪一金额？

- (A) \$6 (B) \$8 (C) \$10 (D) \$12 (E) \$14

10. The cube pictured has six different faces. Which of the following is **not** a possible picture of this cube?

如图所示，该立方体拥有六个不同的面。请问在下列选项中，哪一个不可能是这个立方体的视图？



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

Questions 11 to 20, 4 marks each

11-20 题，每题 4 分

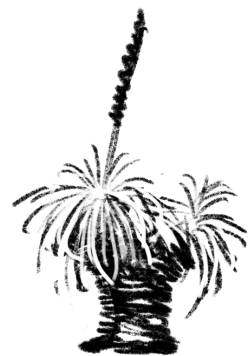
11. The *Balga* is a grass tree found in south-western Australia.

Balgas grow between 1 and 2 centimetres taller each year.

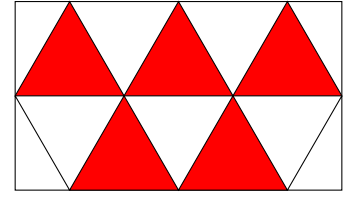
Approximately how old is a Balga that is 4 metres tall?

巴尔加是一种生长在澳大利亚西南部的草树，每年可以长高 1 cm 到 2 cm。请问一棵巴尔加草树大约需要多少年才能长到 4 m?

- (A) 10 years 10 年
 (B) 30 years 30 年
 (C) 60 years 60 年
 (D) 300 years 300 年
 (E) 1000 years 1000 年



12. What fraction of this rectangle is shaded?
 请问阴影部分在该矩形中的占比是多少？



- (A) $\frac{1}{2}$ (B) $\frac{5}{12}$ (C) $\frac{1}{3}$ (D) $\frac{2}{5}$ (E) $\frac{5}{9}$

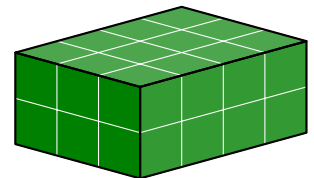
13. A shop has a special deal where you can buy two different items and get the cheaper item at half price. Roberta bought two of these items, and paid \$16. Which two items did she buy?

商店推出了一项优惠活动：若选购两件不同的商品，其中价格较低的商品可半价购买。小罗买了以下两件商品，并支付了 16 美元。请问她买了哪两件商品？

Magazines \$6 each	Gift cards \$12 each	Books \$10 each	Birthday cards \$4 each	Wrapping paper \$8 each
每本杂志 6 美元	每张礼品卡 12 美元	每本书 10 美元	每张生日贺卡 4 美元	每卷包装纸 8 美元

- (A) A birthday card and a magazine 一张生日贺卡和一本杂志
 (B) A gift card and a birthday card 一张礼品卡和一张生日贺卡
 (C) A book and a roll of wrapping paper 一本书和一卷包装纸
 (D) A gift card and a roll of wrapping paper 一张礼品卡和一卷包装纸
 (E) A magazine and a roll of wrapping paper 一本杂志和一卷包装纸

14. A rectangular block measures $4 \times 3 \times 2$ in centimetres. All of its surfaces are painted and then it is cut into 24 cubes of side length 1 centimetre. How many cubes have exactly one face painted?



将一个 $4 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm}$ 的长方体表面都涂上油漆后，再切割成 24 个边长为 1 cm 的立方体。请问有多少个立方体恰好只有一面被涂上了油漆？

- (A) 4 (B) 8 (C) 12 (D) 18 (E) 24

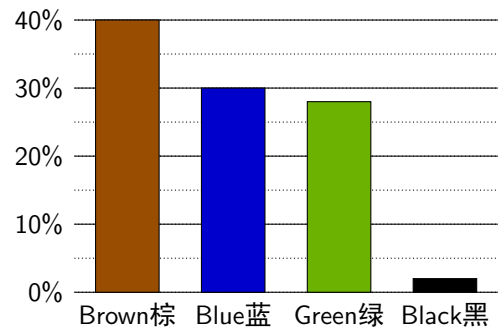
15. James convinces his parents to start a new plan for paying him pocket money. In week 1, they will give him 10 cents and every week after that, they will double the amount they pay him. In which week will he first receive more than \$10 pocket money?

小詹成功说服他的父母启动一项新的零用钱计划。在计划的第 1 周，小詹会获得 10 美分的零用钱。从第 2 周开始，每周的零用钱将是前一周的两倍。请问小詹在第几周收到的零用钱将首次超过 10 美元？

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 10

16. This graph shows the percentages of different eye colours of the students in Year 6. In Year 6, 48 students have brown eyes. What is the total number of students in Year 6?

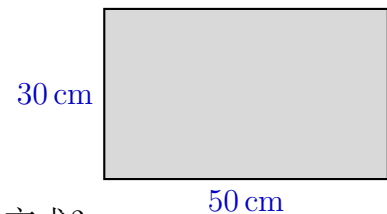
该图表记录了六年级学生中不同眼睛颜色的人数比例。已知棕色眼睛的学生有 48 人。请问六年级总共有多少名学生？



- (A) 96 (B) 100 (C) 120 (D) 132 (E) 144

17. Chester has 5 identical tiles, each measuring 10 cm by 30 cm. He wants to tile the area shown with these tiles. In how many different ways can he do this?

小陈有 5 块尺寸为 10 cm × 30 cm 的瓷砖。他想用这些瓷砖来铺设如图所示区域。请问他有多少种不同的铺设方式？



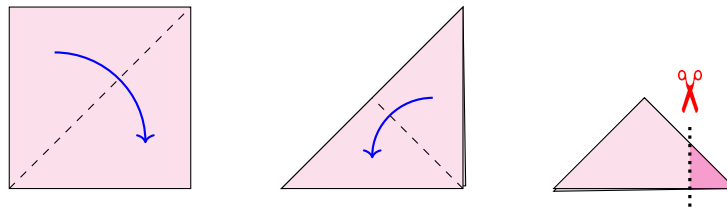
- (A) 2 (B) 4 (C) 6 (D) 8 (E) 10

18. I meant to add two numbers together and then subtract a third number. Unfortunately I got my plus and minus symbols the wrong way round. But I was lucky! The answer still came out to be correct. Which statement **must** be true?

我本打算把两个数字相加后再减去第三个数字，但却错误地将加号和减号的位置放反了。幸运的是，最终结果仍然是正确的。请问下列哪项陈述**必然**成立？

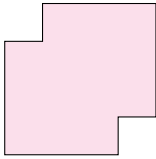
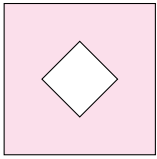
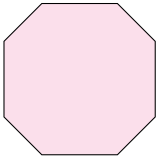
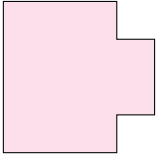
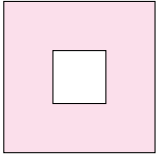
- (A) The first number equals the sum of the other two.
第一个数字等于另外两个数字之和。
- (B) The third number is the difference between the other two.
第三个数字等于另外两个数字之差。
- (C) The first and second numbers are equal.
第一个数字与第二个数字相同。
- (D) The second and third numbers are equal.
第二个数字与第三个数字相同。
- (E) The third number is zero.
第三个数字是 0。

19. A square piece of paper is folded along the dotted lines, as shown in the diagrams. The bottom-right corner is then cut off, as shown by the shading in the third diagram. 如图所示，先将一张正方形纸沿着虚线进行折叠。接着，按照第三幅图的操作，剪掉纸张的右下角（即图中阴影部分）。



When the paper is unfolded, which of the following is the result?

请问下列哪个选项是这张纸重新展开后的样式？

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

20. The number 15 is divisible by its unit digit, that is, $15 \div 5 = 3$. How many whole numbers between 20 and 50 have this property?
数字 15 能够被其个位数整除, 即 $15 \div 5 = 3$ 。请问 20 到 50 之间, 有多少个整数具备这种性质?
- (A) 12 (B) 14 (C) 16 (D) 18 (E) 20

Questions 21 to 25, 5 marks each

21-25 题, 每题 5 分

21. Troy makes a list of 6 numbers by writing down a starting number then writing the next 5 counting numbers, going up in steps of 1. When he adds them, the total is less than 100. He increases each number by 1, and the new total is greater than 100. What is this new total?
小特写下 6 个数, 从第一个数开始写, 后面每个数都比前一个数大 1。这些数的总和原本小于 100, 但当他将每个数都加上 1 之后, 新的总和超过了 100。请问这个新的总和是多少?
- (A) 101 (B) 102 (C) 103 (D) 104 (E) 105

22. To prepare a garden bed for growing ginger, Xiao makes a special mix of *ginger soil*. She first mixes 2 buckets of manure with 4 buckets of compost. Then she mixes 1 bucket of this mixture with 3 buckets of sand to make ginger soil. How much compost is in each bucket of ginger soil?

小晓为了培育一块适合生姜种植的园圃, 特意配置出一种姜土。她先将 2 桶粪肥与 4 桶堆肥混合, 然后再从中取 1 桶混合肥与 3 桶沙子混合, 制成姜土。请问每桶姜土中含有多少堆肥?

- (A) $\frac{1}{6}$ of a bucket $\frac{1}{6}$ 桶
(B) $\frac{1}{8}$ of a bucket $\frac{1}{8}$ 桶
(C) $\frac{2}{9}$ of a bucket $\frac{2}{9}$ 桶
(D) $\frac{1}{10}$ of a bucket $\frac{1}{10}$ 桶
(E) $\frac{1}{12}$ of a bucket $\frac{1}{12}$ 桶

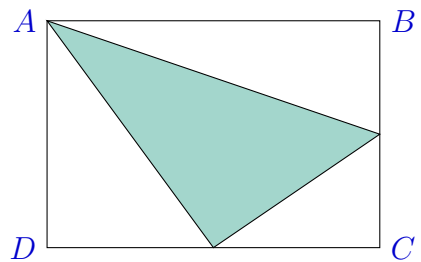
23. A deck of playing cards originally contained 52 cards. Vicki loses some of these. When she deals the cards she has left equally between four people, she has three cards left over. When she deals them equally between six people, she has one card left over. Which of the following could be the number of cards Vicki lost?

一副完整的卡牌最初有 52 张。小维不慎丢失了若干张。如果她将剩下的牌平均分给 4 个人，她还剩下 3 张牌；如果她将剩下的牌平均分给 6 个人，她还剩下 1 张牌。请问小维可能丢失了多少张牌？

- (A) 2 (B) 10 (C) 11 (D) 17 (E) 21

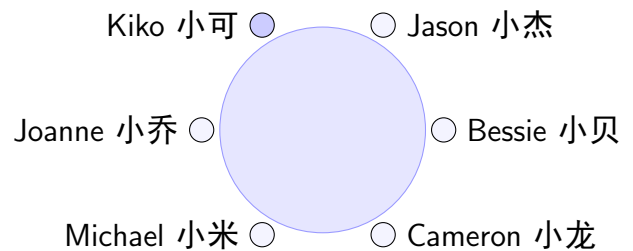
24. The area of this rectangle is 56 square centimetres. The midpoints of BC and DC are joined to A and to each other, to form the shaded triangle shown. What is the area of this triangle in square centimetres?

图中矩形面积为 56 cm^2 。 BC 和 DC 的中点分别与 A 点相连，同时再将这两个中点相连，构成图中所示的阴影三角形。请问这个阴影三角形的面积是多少 cm^2 ？



- (A) 14 (B) 21 (C) 24 (D) 25 (E) 28

25. Kiko and 5 of her friends are seated around a restaurant table. Each person introduces themselves, telling everyone how many of the people at the table they've previously met. Naturally, Kiko has met all 5. Coincidentally, the other 5 have all met the same number as each other. Which of the following is **not** a possibility for this number that all 5 of Kiko's friends have met?



小可与她的 5 个朋友围坐在一张桌子上。每个人介绍自己，并告诉大家他们之前见过在场的多少人。小可见过在场的所有人，而其他 5 人见过的人数恰好都相同。请问下列哪个数字不可能是这 5 人见过的人数？

- (A) 1 (B) 3 (C) 4 (D) 5
(E) All of (A) to (D) are possible. 以上四个选项都有可能。

For questions 26 to 30, shade the answer as a whole number from 0 to 999 in the space provided on the answer sheet.

问题 26-30 的答案为 0-999 之间的整数，请将答案填涂在答题卡对应区域。

Questions 26–30 are worth 6, 7, 8, 9 and 10 marks, respectively.

第 26-30 题分别为 6, 7, 8, 9, 10 分。

26. Jane has four doting grandparents who each separately tell her that they will help her with her savings plans.

小简有四位宠爱她的祖父母，他们都表示愿意支持小简的储蓄计划。

- Granny Ava says, ‘Whatever you have when you come to me, I will add \$10.’
艾维奶奶说：“你来看我时无论有多少钱，我都会额外给你 10 美元。”
- Granny Beth says, ‘Whatever you have when you come to me, I will double it.’
贝丝外婆说：“你来看我时无论有多少钱，我都会将它翻倍。”
- Grampa Charles says, ‘Whatever you have when you come to me, I will halve your savings but then add \$50.’
查理斯爷爷说：“你来看我时无论有多少钱，我会先将它减半，再添上 50 美元。”
- Grampa Dave says, ‘Whatever you have when you come to me, I will double it and add \$5.’
戴夫外公说：“你来看我时无论有多少钱，我会将它翻倍并额外给你 5 美元。”

Jane has saved \$10 by herself. She plans to visit each grandparent once, in the order that maximises the amount she has at the end. In dollars, what is this maximum amount?

小简已经存了 10 美元，她计划按照可以使得最终金额达到最大的顺序，分别拜访每位祖父母一次。请问小简能拥有的最大金额是多少美元？

27. The numbers 1 to 6 are arranged to form two 3-digit numbers that are then added together. What is the difference between the largest and smallest sums that can be obtained?

把数字 1 到 6 排列组合成两个 3 位数，然后将这两个数相加。请问可以得到的最大总和与最小总和之差是多少？

28. Skip counting by 5, I write a list of 400 numbers that starts 5, 10, 15 and ends 1990, 1995, 2000. How many times do I write the digit ‘0’?

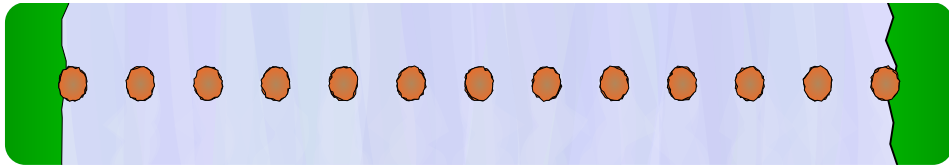
我写下了 400 个数，从 5、10、15 开始写，后一个数字总比前一个数字大 5，最后以 1990、1995、2000 结尾。请问数字 ‘0’ 一共出现了多少次？

29. Starting with the number 2024, a second number is calculated by squaring each digit and adding these squares together: $2^2 + 0^2 + 2^2 + 4^2 = 24$. The third number is then calculated by adding the squares of the digits of the second number. This continues until the 999th number. What is the 999th number?

从第一个数 2024 开始，将它各位数字的平方求和得到第二个数： $2^2 + 0^2 + 2^2 + 4^2 = 24$ 。接着再将第二个数各位数字的平方求和得到第三个数。以此类推，直到得到第 999 个数。请问第 999 个数是多少？

30. To cross a river, there are 13 stepping stones in a line, equally spaced 50 centimetres apart.

过河时需要将 13 块垫脚石等距排列为一排，每两块垫脚石之间的距离为 50 cm。



I would like to start at the first and finish at the last, and step on each stepping stone exactly once. I can take both 50 centimetre and 1 metre steps, both forwards and backwards. How many ways are there for me to cross the river?

我想从第一块垫脚石开始过河，过河期间每块垫脚石恰好踩一次，到达最后一块垫脚石即过河成功。我每一步都可以向前或向后迈 50 cm 或 1 m。请问我有多少种不同的过河方式？