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MTSE 2026

Mathematics Talent Search Examination 2026

Class 5–6 | 2 hours



NAME _____

CLASS / SECTION _____ ROLL NO. _____ DATE _____

General Instructions

1. This paper has **25 questions** in total, based on **5 case studies**. Each case study is followed by 5 questions.
2. Time allowed: **2 hours**. Each question carries **4 marks** (maximum **100 marks**). There is **no negative marking**.
3. Read each case study carefully before answering the questions that follow it. **Calculators are not allowed.**
4. Each question has four options (A, B, C and D), and **only one is correct**.
5. Mark your answers on the **OMR sheet provided**. Fill in the circle for the correct option completely.
6. Write your name and details on the paper and the OMR sheet.

CASE STUDY 1	CASE STUDY 2	CASE STUDY 3	CASE STUDY 4	CASE STUDY 5
Paper Cutting Puzzle	Same Perimeter, Different Areas	The Balance Puzzle	The Gear Train	The Matchmaker's Count
Q 1 – 5	Q 6 – 10	Q 11 – 15	Q 16 – 20	Q 21 – 25

CASE STUDY 1

Paper Cutting Puzzle



QUESTIONS
1 – 5
5 × 4 = 20 marks

Imagine cutting a sheet of paper with straight cuts. Some ways of cutting make more pieces than others. How can we get the most pieces?

The key rule

- Each new cut must cross **every cut made before it**.
- Cross them all **on the paper**.
- Use a **new spot** for every crossing.
- Never let three cuts meet at one spot.

Why does this make more pieces?

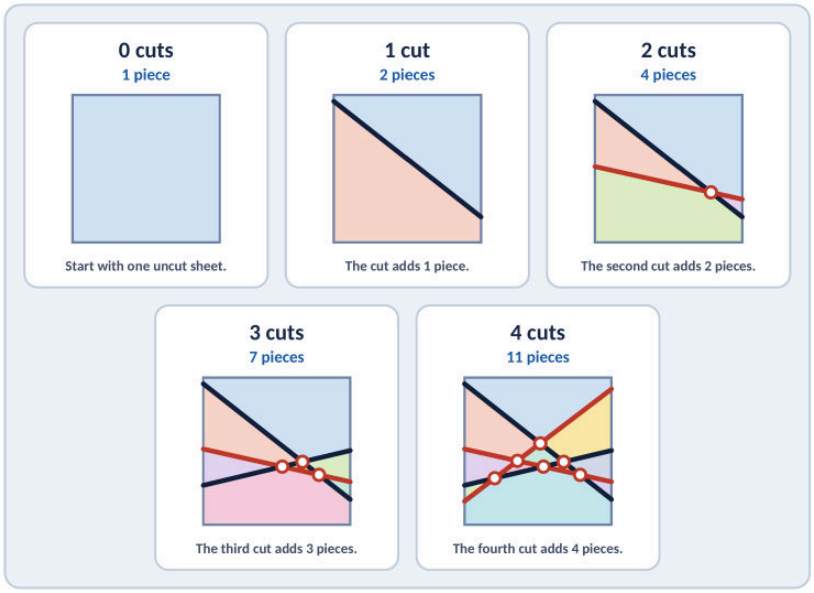
A new cut is split into parts by its crossings. Each part cuts one old piece in two. So each part adds one new piece.

Look at the pattern:

Cuts	0	1	2	3	4
New pieces added	–	+1	+2	+3	+4
Total pieces	1	2	4	7	11

Each new cut adds one more piece than the cut before. Next: +5, +6, +7 ...

Follow the key rule to get the most pieces.



Questions

1 What is the greatest number of pieces that 5 cuts can make?

A. 10 **B.** 11 **C.** 15 **D.** 16

2 What is the greatest number of pieces that 8 cuts can make?

A. 29 **B.** 36 **C.** 37 **D.** 44

3 A new cut crosses 10 earlier cuts. Every crossing is at a different spot on the paper. How many new pieces does it make?

A. 9 **B.** 10 **C.** 11 **D.** 20

4 Each cut is placed to make the most pieces. Which cut adds 9 new pieces?

A. 9th **B.** 10th **C.** 11th **D.** 12th

5 Each cut is placed to make the most pieces. What is the fewest number of cuts needed to get at least 20 pieces?

A. 5 **B.** 6 **C.** 7 **D.** 8

CASE STUDY 2

Same Perimeter, Different Areas

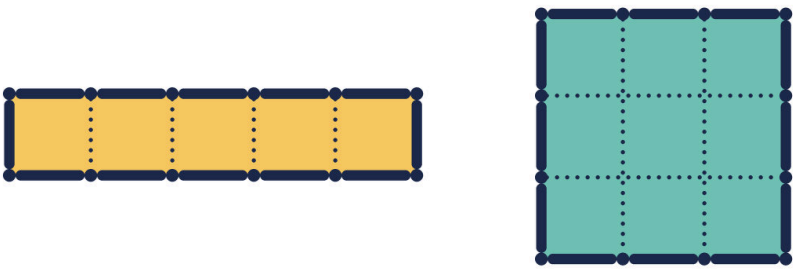


QUESTIONS
6 – 10
5 × 4 = 20 marks

Imagine making a rectangle with sticks. All the sticks are the same length. The sticks make the border. Small squares fill the space inside.

Perimeter is the length around a shape. Here, count the sticks in the border. **Area** is the space inside a shape. Here, count the squares inside the border.

Two rectangles can use the same number of sticks. But they can have different areas. The number of sticks may be different in each question.



Long rectangle
12 sticks · 5 squares

Square
12 sticks · 9 squares

Both use 12 sticks.

Questions

6 A rectangle's border uses 34 sticks. Each side has a whole number of sticks. What is the greatest area it can have?

A. 68 squares **B.** 70 squares **C.** 72 squares **D.** 81 squares

7 A rectangle is made with 28 sticks. At first, its sides are 4 sticks and 10 sticks long. Then the sides change to 5 sticks and 9 sticks. Then they change to 6 sticks and 8 sticks. At the end, they change to 7 sticks and 7 sticks. How many more squares does the rectangle cover after each change?

A. 5 squares, then 3 squares, then 1 square
B. 1 square, then 3 squares, then 5 squares
C. 5 squares every time
D. 4 squares, then 3 squares, then 2 squares

8 A rectangle uses 26 sticks. It has 40 squares inside. What are its side lengths?

A. 4 sticks and 9 sticks
B. 5 sticks and 8 sticks
C. 6 sticks and 7 sticks
D. 3 sticks and 10 sticks

9 A rectangle has whole-number sides. It uses 24 sticks and has 30 squares inside. Is this possible?

A. Yes. Its sides are 3 sticks and 9 sticks.
B. Yes. Its sides are 4 sticks and 8 sticks.
C. No. Its greatest possible area is 30 squares.
D. No. Two sides that add up to 12 sticks never make an area of 30 squares.

10 A square garden has a border of 24 sticks. The border is made bigger, with 28 sticks. How many more squares does the garden cover?

A. 4 squares **B.** 7 squares **C.** 12 squares **D.** 13 squares

CASE STUDY 3

The Balance Puzzle



QUESTIONS
11 – 15
5 × 4 = 20 marks

A balance scale has two pans. Each green tile weighs the same. Each mystery box (□) holds some tiles. Every box holds the same number of tiles. We do not know the number yet.

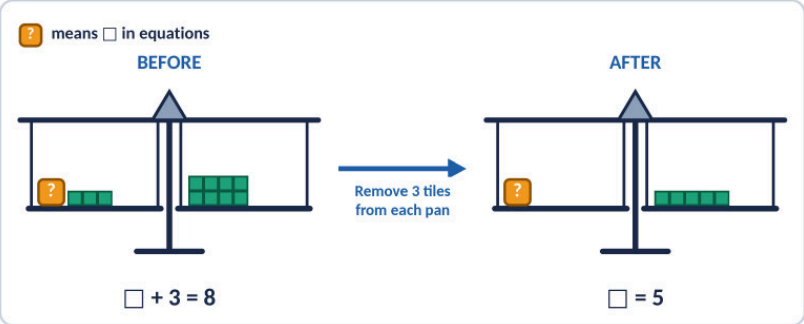
When both pans weigh the same, they stay at the same height. We say the scale is **level**.

The scale stays level if we do the **same thing to both pans**. Use these three moves to find the number of tiles in one box.

Three Golden Moves

A. Remove the same tiles from both pans

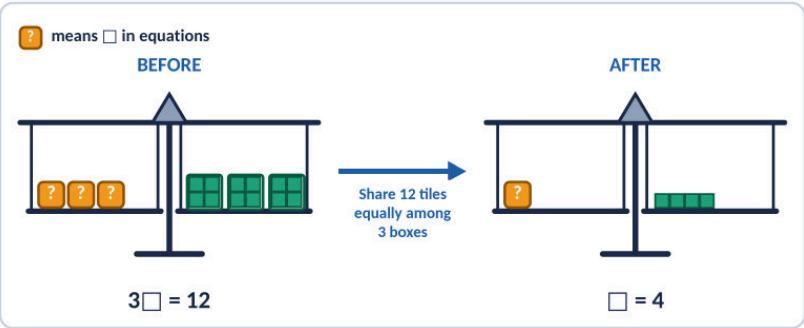
Remove the same number of tiles from both pans. The scale stays level. In the picture below, remove 3 tiles from each pan. One box is left on one pan. 5 tiles are left on the other pan. So □ + 3 = 8 becomes □ = 5.



B. Share the tiles equally

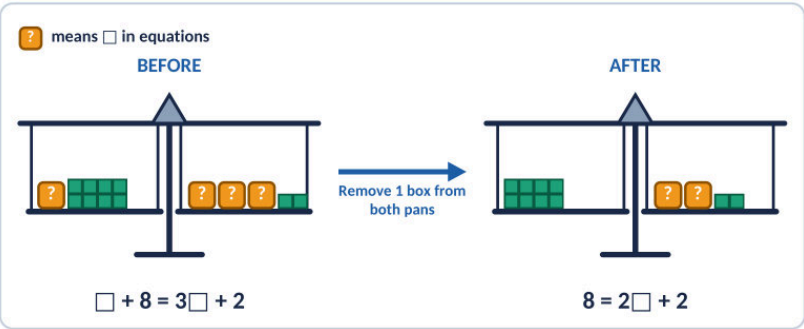
Sometimes one pan has only boxes. The other pan has only tiles. Share the tiles equally among the boxes.

In the picture below, 3 boxes balance 12 tiles. Share 12 tiles equally among 3 boxes. Each box gets 4 tiles. We write 3□ = 12, so □ = 4. (3□ means 3 boxes.)



C. Remove the same boxes from both pans

Sometimes both pans have boxes. Remove the same number of boxes from both pans. Then all the boxes are on one pan. In the picture below, remove 1 box from each pan. The left pan has 8 tiles. The right pan has 2 boxes and 2 tiles. We write 8 = 2□ + 2. Now use moves A and B to find the number of tiles in one box.



Use these moves to find what one box holds. You can use more than one move.

Questions

11 A scale is level. One pan has 2 boxes and 6 tiles. The other pan has 22 tiles. How many tiles are in each box?

A. 6 B. 8 C. 11 D. 16

12 A scale is level. One pan has 1 box and 11 tiles. The other pan has 3 boxes and 3 tiles. How many tiles are in each box?

A. 4 B. 5 C. 6 D. 7

13 A scale is level. The left pan has 2 boxes and 5 tiles. The right pan has half a box and 20 tiles. How many tiles are in one whole box?

A. 5 B. 6 C. 8 D. 10

14 A scale is level. The left pan has 3 boxes and 4 tiles. The right pan has 2 boxes and 13 tiles. Mira moves 1 box from the left pan to the right pan. Now the scale is not level. How many tiles must she add to the left pan to make it level again?

A. 9 B. 18 C. 22 D. 27

15 Scale A is level. Its left pan has 2 boxes and 3 tiles. Its right pan has 1 box and 12 tiles. Scale B has 3 boxes and some tiles on its left pan. It has 5 boxes and 1 tile on its right pan. Scale B is level. Every box holds the same number of tiles on both scales. How many tiles are on the left pan of Scale B?

A. 10 B. 18 C. 19 D. 28

CASE STUDY 4

The Gear Train



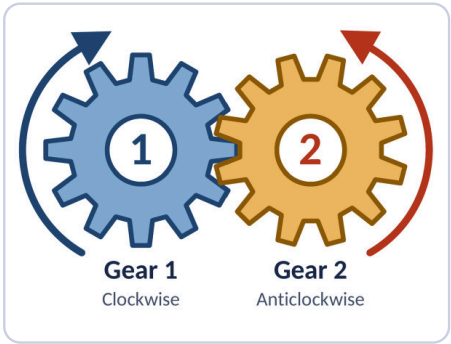
QUESTIONS
16 – 20
5 × 4 = 20 marks

Gears are wheels with **teeth**. Teeth are the small bumps around the edge of a gear. Two gears are placed so that their teeth fit between each other. When one gear turns, its teeth push the teeth of the other gear. So the other gear turns too. Two simple rules tell us how they turn.

The 2 Simple Rules of Gears

A. Touching gears turn in opposite directions

Clockwise is the way the hands of a clock move. **Anticlockwise** is the opposite way. If Gear 1 turns clockwise, Gear 2 turns anticlockwise.

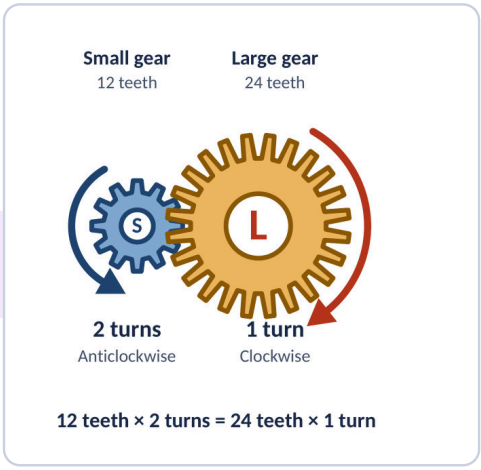


B. Count the teeth to find the turns

Where two gears touch, the same number of teeth pass on both gears. So:

Teeth of Gear 1 × turns of Gear 1 =
Teeth of Gear 2 × turns of Gear 2

A gear with more teeth turns fewer times. A gear with fewer teeth turns more times.



Questions

16 A gear with 10 teeth turns 3 times clockwise. It turns a gear with 15 teeth. How does the second gear turn?

A. 2 turns anticlockwise
B. 2 turns clockwise
C. 4½ turns anticlockwise
D. 4½ turns clockwise

17 A gear with 12 teeth makes half a turn. It touches a gear with 8 teeth. How much of a turn does the gear with 8 teeth make?

A. ½ **B.** ⅔ **C.** ¾ **D.** 1

18 A gear with 12 teeth touches three other gears, one at a time. They have 6 teeth, 12 teeth and 18 teeth. The gear with 12 teeth makes one full turn each time. Which list shows the three gears from the most turns to the fewest turns?

A. 18 teeth, 12 teeth, 6 teeth
B. 12 teeth, 6 teeth, 18 teeth
C. 6 teeth, 18 teeth, 12 teeth
D. 6 teeth, 12 teeth, 18 teeth

19 Four gears touch in a row. Each gear touches the next one. Gear A has 6 teeth. Gear B has 12 teeth. Gear C has 8 teeth. Gear D has 4 teeth. Gear A turns 4 times clockwise. How does Gear D turn?

A. 6 turns anticlockwise
B. 6 turns clockwise
C. 3 turns anticlockwise
D. 3 turns clockwise

20 A gear with 8 teeth touches a gear with 12 teeth. Each gear has one marked tooth. At the start, both marked teeth are at the place where the gears touch. The gears turn. How many turns does each gear make before both marked teeth are at that place again for the first time?

A. 8 teeth: 2 turns; 12 teeth: 1 turn
B. 8 teeth: 3 turns; 12 teeth: 2 turns
C. 8 teeth: 4 turns; 12 teeth: 3 turns
D. 8 teeth: 6 turns; 12 teeth: 4 turns

CASE STUDY 5

The Matchmaker's Count



QUESTIONS
21 – 25
5 × 4 = 20 marks

A tournament is a set of matches between players. Imagine a tournament where every player plays every other player. Each pair of players plays only one match. How can we count all the matches without counting any match twice?

Let the players walk in one by one.

1st Player	walks in: Nobody is there yet —> 0 matches.
2nd Player	walks in: Plays against Player 1 —> +1 new match.
3rd Player	walks in: Plays against the 2 players already there —> +2 new matches.
4th Player	walks in: Plays against the 3 players already there —> +3 new matches.
5th Player	walks in: Plays against the 4 players already there —> +4 new matches.

With 5 players, the total is 1 + 2 + 3 + 4 = 10 matches. Each new player plays every player who is already there. Use this pattern to find the number of matches. You can also use it to find the number of players.

Matches that have no player in common can be played at the same time.

Questions

21 Seven players play a tournament. Every player plays every other player once. How many matches are played?

A. 21 **B.** 28 **C.** 42 **D.** 49

22 In a tournament, every player plays every other player once. The 8th player walks in. How many new matches does this player add?

A. 6 **B.** 7 **C.** 8 **D.** 28

23 Six players have played all their matches. Then 1 new player joins. This player plays every player who is already there. How many more matches are played?

A. 6 **B.** 7 **C.** 8 **D.** 21

24 In a tournament, every player plays every other player once. There are 15 matches in all. How many players are there?

A. 4 **B.** 5 **C.** 6 **D.** 15

25 Four players play a tournament. Every player plays one game against every other player. The games are played in time slots. In one time slot, a player can play only one game. But many games can be played at the same time, if the players are different. What is the smallest number of time slots needed to finish all the games?

A. 2 **B.** 3 **C.** 4 **D.** 6

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All the Best!

