2025 HFL EDUCATION
YEAR 3 MATHEMATICS CHALLENGE.

EVENT GUIDANCE AND PRACTICE QUESTIONS

Event Guidance

Format

- There will be a choice of four 1-hour heats for teams to join online from their school.
- The 20 highest scoring teams from across the heats will be invited to join us online again for the Grand Final.
- Schools can enter multiple teams on the same date or across different heat dates.
- Each team should be made up of four Year 3 pupils who will work together to solve questions and problems across three live rounds.

Live rounds

- There are three rounds in each live heat.
- Two rounds consist of 5 questions or problems to solve.
- One round consists of visual estimation questions and problems.
- There is a time limit (up to 2 minutes) for each question which will be explained by the presenter in each round.
- A 'final few seconds' prompt will be provided by the presenter so teams can agree their answer and get ready for the next question.

The pre-round

- There is one round for pupils to complete before the heat. This is the 'Spot the Shape!' round.
- The materials and rules for this round will be made available prior to the heat.
- This round is not strictly timed. We anticipate that it will take around 15 minutes to complete.
- Team answers will be submitted on the Google Form along with answers from the live event.

Submitting answers

- 'Team answer sheets' will be available to download prior to the live event. These can be printed and provided to the team to write on.
- Final answers need to be entered into the Google Form by the supervising adult.
- Submission of answers will be explained during the live event.

Scores

- Following the completion of the live heats, team marks will be emailed to the school contact.
- A certificate for each member of the team will also be sent to the school contact.

Invitation to the final

After all four heats have been completed, the 20 highest scoring teams will be notified by email and invited to take part in the final on **Wednesday 25th June from 1.30 – 3.10pm.**

The event platform for the heats

- The heats and final will take place on the HFL Education webinar platform.
- For the best functionality, we recommend accessing the event using Google Chrome, Safari or Firefox as the web browser.
- Instructions for joining the live event will be provided upon booking.
- For any issues with the registration process, please contact us at **primarymaths@hfleducation.org**.

Getting ready

- The team will need to have clear access to a screen and sound. A class whiteboard or screen is advisable for size but not essential.
- Pupils cannot be seen or heard by other schools or the presenters.
- The supervising adult can use the 'chat' facility to communicate with the presenters.
- We recommend that pupils have paper, pencils, pens, and erasers.
- Supervising adults are asked to ensure that pupils do not have calculators or rulers.

If you have entered multiple teams

- If you have entered more than 1 team, schools can choose whether the teams will take part from the same room (separated) or in different rooms.
- Decide who team A and Team B etc are and include this in the team name on the Google Form.
- If teams are in the same room, please ensure the screen they can all see is large enough.

Correspondence

All correspondence, including queries, should be sent to **primarymaths@hfleducation.org**

Challenge, teamwork, making sense of problems and sharing ideas

To support your team, we have compiled some practice questions and top tips for each round.

Challenge

The competition is designed to be fun and will challenge teams in many ways. Not least in the mathematical focuses, but also in working 'well' as a team and agreeing answers within the time limit set.

Teamwork

Collaborative working in mathematics (and in life) is a crucial skill. The competition challenges how well teams can work together. Alongside practising strategies to solve mathematical questions and problems, it is also helpful to consider how to be a great team.

Tips for developing great teamwork:

Working together is crucial. Think about how you can best do this.

- Decide upon who the 'scribe' (answer recorder) is. This isn't the person who makes the final decision, but they will ensure that your team commits to an answer before time runs out.

- Use paper to record your jottings and ideas. These will be helpful when showing other team members your thoughts.

- You may decide to quickly divide up parts of a question to work out a smaller part each before coming back together to agree an overall answer.

- Think through how you can quickly reach an agreement, listen to each other, and consider each team member's response. Agreeing how you will calmly negotiate will really help in the midst of the competition.

Making sense of problems and sharing ideas

When thinking about and articulating their thoughts around a problem or question, children might find the following sentence frames useful:

- I can see …
- I have noticed …
- I know that …
- If … then …
- I see what you mean. What I've noticed is that … What do you think?

Practice Questions

The following practice questions and answers will be available as a PowerPoint upon booking for use in school.

Round 1 and 4 – General mathematics

These two rounds each consist of 5 questions that need to be solved within a 2 minute time limit. Teams must work quickly and efficiently. Each question will have a different mathematical focus and will require different types of problem-solving skills.

Each question is 'marked' out of 10. Marks can be awarded for partial answers.

Some questions ask pupils to complete a calculation. In these, pupils can solve separately and then compare their answers to agree the team's response.

Questions with 'parts'

Some questions contain 'parts' to solve. Team members could solve one 'part' each and then use these to agree an overall answer. A team member may have a strength in one aspect but teams will need to decide quickly if they are going to distribute roles as the clock will be ticking.

Some example 'parts' style questions:

Solutions can be found on page 11.

Order these multiplications from largest to smallest product.
(answer in the form of D, B, A, C)

A) 2 x 12 x 2
B) 2 x 3 x 4
C) 8 x 2 x 5
D) 10 x 7 x 1

HFL

Order these shapes by perimeter length
(shortest perimeter to longest).
(answer in the form of D, B, A, C)

A) a regular pentagon where each side is 6cm in length
B) a triangle with sides of 12cm, 24cm and 18cm
C) a square where each side is 15cm
D) a rectangle where the shorter sides are 8cm each and the longer sides are 13cm each

HFL

If each visitor spent £2 on a bottle of water, on which day would the cinema make closest to £310 in water sales?

Days of the week	Visitors to the cinema
Monday	★★
Tuesday	★★★
Wednesday	★★
Thursday	★★★
Friday	★★★★★
Saturday	★★★★★★★★
Sunday	★★★★

★ = 50 people

HFL

Put these in order, starting with the smallest answer.
(answer in the form of D, B, A, C)

A) $\frac{2}{4}$ of 90
B) 9 x 3
C) 47 – 9
D) 25 + 26

HFL

Problem-style questions

Some questions require pupils to problem solve in context. Teams will have to work quickly to establish what the problem is asking them to do and identify the relevant information that they need to work on.

Teams can work separately or in pairs to work on the problem and then confer to agree the solution.

Being able to make quick sketches and representations to aid thinking will support this, as will pausing to consider what is 'known' and what is 'unknown' in a problem.

Some examples of 'problem-style' questions:

Solutions can be found on page 12.

X	16	47	Each picture stands for a number.

Each picture stands for a number.
The row and column totals are shown.

Find the value of **X**.

6 © HFL EDUCATION

The same digit is hidden by the paint splodges.
What is the digit?

$$3 \; \bullet \; 2$$
$$+ \; 2 \; 4 \; \bullet$$
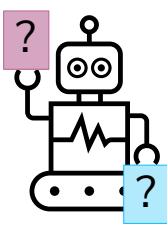$$\bullet \; 0 \; 8$$

7 © HFL EDUCATION

Jamie is serving orange juice at a party.
Each carton serves 4 people.

ORANGE JUICE

There are 29 guests coming.
How many cartons will Jamie need to buy?

8 © HFL EDUCATION

What two calculations does the robot do?

5 → ? → 9
6 → → 11
7 → → 13
8 → ? → 15

9 © HFL EDUCATION

Round 2 – Visual estimation

This round consists of a series of questions and problems that focus on pupils' visual estimation skills.

Each answer in the estimation round is worth up to 10 points. Teams do not need to have the 'exact' answer. Instead, they use their estimation skills to agree answers that are approximately accurate.

Marks are awarded in 'zones of closeness'. So, for example, if the exact answer was 100, pupils would be awarded the full 10 marks for an answer between 95 – 105. Points then decrease incrementally as the distance from the 'exact' answer increases.

As this challenges estimation, we suggest pupils practise by thinking about what good estimates might be. Teams might also think about how they can work together to look at the visual stimulus, think separately or in pairs and then reach an agreed team response.

The most important tip is to look carefully at the image and the clues and prompts already provided.

The following questions provide opportunities for practice of estimation and of team-working:

Solutions can be found on page 13.

Estimate how many bees are in the picture.

11 © HFL EDUCATION
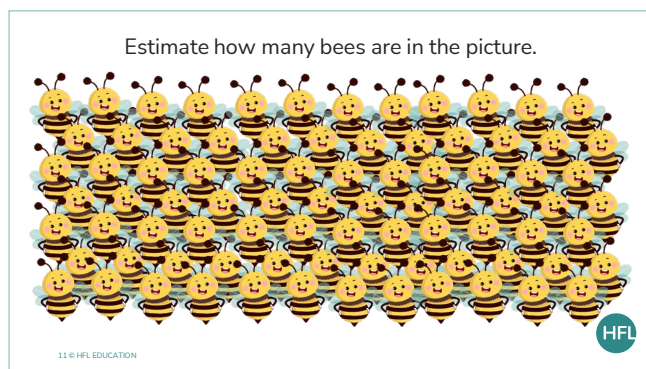
Tips:

- Remember this is a visual estimation question and not an exact counting one.
- Would splitting the image into sections for each team member to scan and approximate help?
- Would taking an estimate from a quarter and then scaling up help?

What is the value at point P on this zigzag number line?

154

137

P

12 © HFL EDUCATION
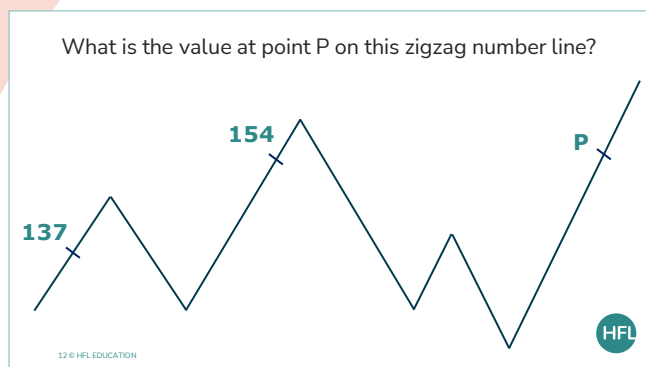
Tips:

- Estimate the position of other 'benchmark' numbers and the space between them.
- Think about whether the line is increasing or decreasing in value as it zigzags toward point P.

HFL Education

Round 3 – Spot the shape!

For the 'Spot the Shape!' round, teams will be required to complete a challenge related to geometry before their live event. There will be a space to enter the team's answer within the 'team answer sheet' and will be submitted for marking within the Google Form.

Marks will be awarded for partial answers. For example, if there were 10 shapes within the image, the full 10 marks would be awarded for an exact answer of 10. Points would then decrease incrementally where fewer shapes have been discovered.

Vocabulary that may be useful for team discussion when completing the 'Spot the Shape!' challenge:

Vocabulary list taken from the **HFL Mathematics Vocabulary Index.**

Year 1	Year 2	Year 3
pattern	vertical	orientation
2-D / two-dimensional	horizontal	degree / degrees
rectangle / rectangles	vertex / vertices	angle
square / squares	edge / edges	right angle
circle / circles	face / faces	perpendicular
kite / kites	quadrilateral / quadrilaterals	parallel
triangle / triangles	polygon / polygons	horizontal
3-D / three-dimensional	pentagon / pentagons	vertical
cube / cubes	hexagon / hexagons	quadrilateral
cuboid / cuboids	heptagon / heptagons	polyhedron
pyramid / pyramids	octagon / octagons	polyhedral
cylinder / cylinders	prism / prisms	acute angle
sphere / spheres	cone / cones	obtuse angle
side / sides	symmetry	reflection
line	line of symmetry	orientation
straight	surface	three-dimensions
curved / flat	mirror line	internal angle
open / closed shape	properties	congruent
corner	classify	
base	opposite	
point	regular	
diagonal	irregular	
pentagon / pentagons		
hexagon / hexagons		
heptagon / heptagons		
octagon / octagons		
opposite		

An example 'Spot the shape!' question:

How many triangles are in the picture?
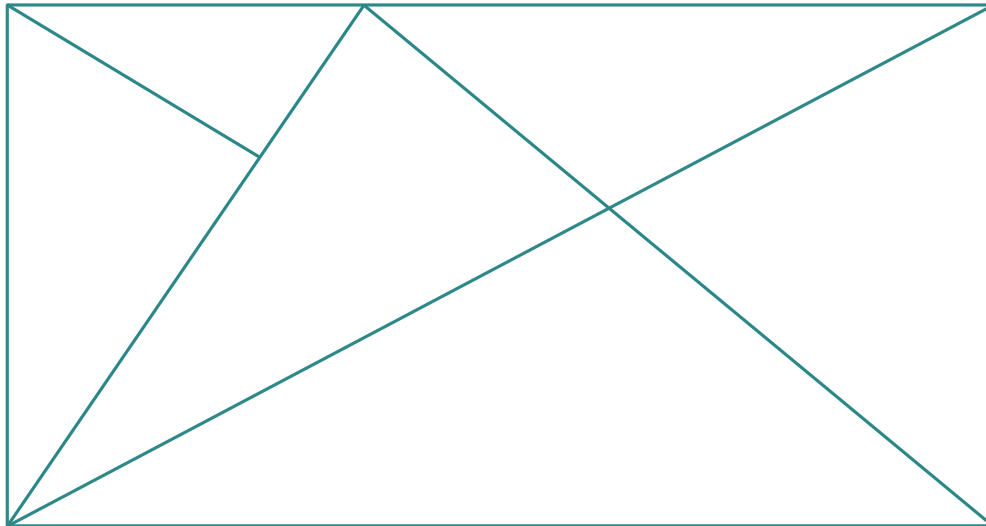
14 © HFL EDUCATION

Tips:

- Consider the properties of the shape being searched for.
- Consider how to work strategically:
  - Will your team begin with the smallest shapes or the biggest shapes?
  - Will your team start from a particular corner or place and track round?
  - How will your team track the shapes already found and those that are newly discovered?
- Consider how your team will work. Will you work together as a full team? Will you split up and work individually or in pairs and then come back together?

Solutions

Order these multiplications from largest to smallest product.
(answer in the form of D, B, A, C)

A) 2 x 12 x 2
B) 2 x 3 x 4
C) 8 x 2 x 5
D) 10 x 7 x 1

A) 2 x 12 x 2 = 48

B) 2 x 3 x 4 = 24

C) 8 x 5 x 2 = 80

D) 10 x 7 x 1 = 70

C, D, A, B

Order these shapes by perimeter length
(shortest perimeter to longest).
(answer in the form of D, B, A, C)

A) a regular pentagon where each side is 6cm in length
B) a triangle with sides of 12cm, 24cm and 18cm
C) a square where each side is 15cm
D) a rectangle where the shorter sides are 8cm each and the longer sides are 13cm each

A) 5 x 6 = 30cm

B) 12 + 18 + 24 = 54cm

C) 15 x 4 = 60cm

D) 8 + 8 + 13 + 13 = 42cm

A, D, B, C

If each visitor spent £2 on a bottle of water, on which day would the cinema make closest to £310 in water sales?

Days of the week	Visitors to the cinema
Monday	★★
Tuesday	★★✦
Wednesday	★✦
Thursday	★★★
Friday	★★★★✦
Saturday	★★★★★★★✦
Sunday	★★★★

★ = 50 people

Monday – 100 x £2 = £200

Tuesday 125 x £2 = £250

Wednesday – 75 x £2 = £150

Thursday – 150 x £2 = £300

Friday – 225 x £2 = £450

Saturday – 375 x £2 = £750

Sunday – 200 x £2 = £400

Put these in order, starting with the smallest answer.
(answer in the form of D, B, A, C)

A) $\frac{2}{4}$ of 90
B) 9 x 3
C) 47 – 9
D) 25 + 26

A) 45

B) 27

C) 38

D) 51

B, C, A, D

Solutions (continued)

X   16   47

🍪	🍓	🍪	47
🍊	🍊	🍪	33
🍓	🍓	🍓	15

Each picture stands for a number.

The row and column totals are shown.

Find the value of **X**.

6 © HFL EDUCATION

Strawberry = 5

Orange = 6

Gingerbread man = 21

X = 32

The same digit is hidden by the paint splodges.
What is the digit?

$$3 \; ● \; 2$$
$$+ \; 2 \; 4 \; ●$$
$$● \; 0 \; 8$$

7 © HFL EDUCATION

362 + 246 = 608

Missing digit = 6

Jamie is serving orange juice at a party.
Each carton serves 4 people.

There are 29 guests coming.
How many cartons will Jamie need to buy?

8 © HFL EDUCATION

7 cartons would serve 28 guests

8 cartons would be needed

What two calculations does the robot do?

5 ⟹ ?   ⟹ 9
6 ⟹   ⟹ 11
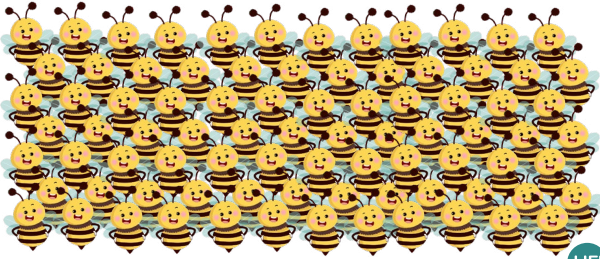7 ⟹   ⟹ 13
8 ⟹ ?   ⟹ 15

9 © HFL EDUCATION

x 2 and – 1

Solutions (continued)

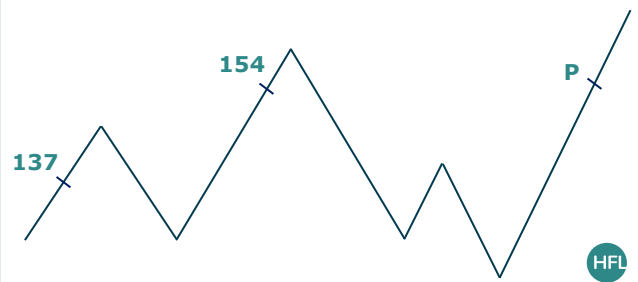Estimate how many bees are in the picture.

11 © HFL EDUCATION

There are **84 bees** in the picture.

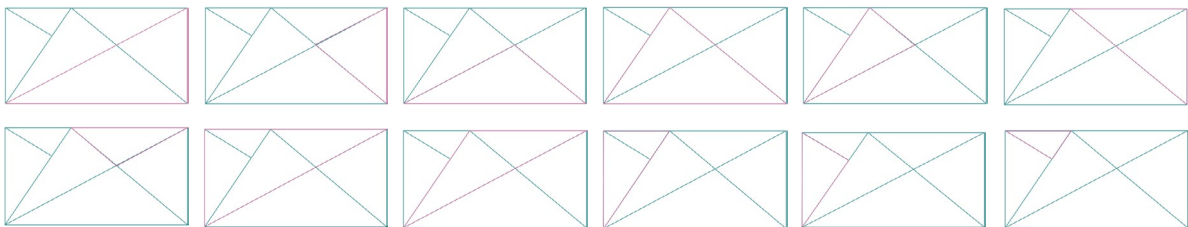What is the value at point P on this zigzag number line?

154

137

P

12 © HFL EDUCATION

P = 186

How many triangles are in the picture?

How many triangles are in the picture?

There are 12 triangles in the picture

15 © HFL EDUCATION