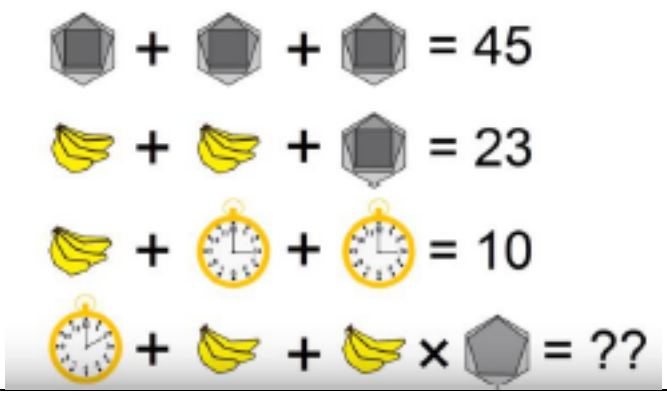
AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES
SCHOOLS ENRICHMENT CENTRE (AIMSSEC)
AIMING HIGH

BANANAS CLOCK AND HEXAGON



Can you figure this out?

Help

You could work with a partner to solve the puzzle.

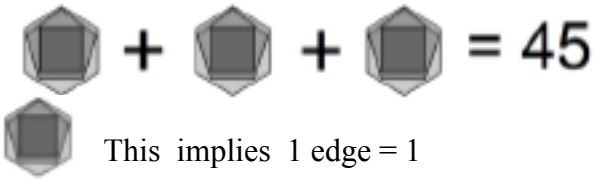
You might try choosing values for the different shapes to see what happens. Then learning from what happens, you could try different values. It might take several trials but you could get closer and closer to the answers that way. This is not the only method so you might find another way.

Extension

Create your own puzzle and give it to a friend to solve.
You could use Bananas, Clock, Hexagon with different values and write in your own totals leaving some totals for someone else to discover. Or you could use your own pictures to create your own puzzle.

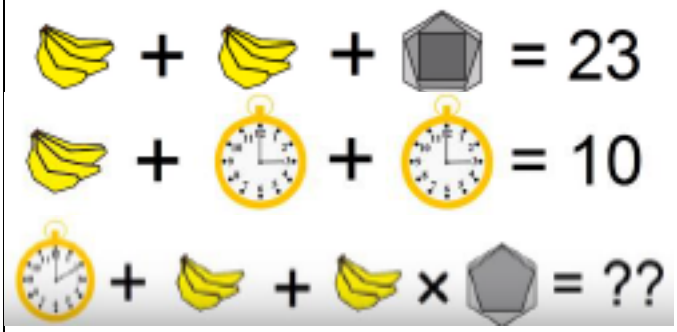
NOTES FOR TEACHERS

SOLUTION



Each of the hexagon pictures in the first and the second equation has 15 edges.

This implies 1 edge = 1



4 Bananas + 4 Bananas + 15 edges = 23, which implies 1 Banana = 1.

4 Bananas + 3 o'clock + 3 o'clock = 10, which implies each hour = 1.

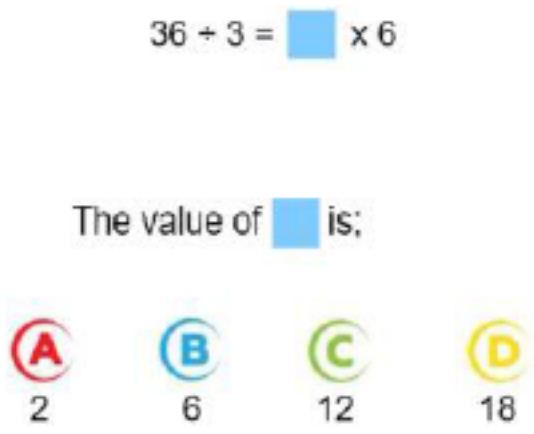
This equation implies: 2 o'clock + 3 Bananas + 3 Bananas * 11 edges =??

2 + 3 + 3 * 11 = 2 + 3 + (3 * 11) =??

5 + 33 = 38 so the answer is 38.

Diagnostic Assessment This should take about 5–10 minutes.

1. Write the question on the board, say to the class:
   "Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D".
2. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. **Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.



The correct answer is A.
Possible misconceptions:

Common Misconceptions

Learners who answer B, C or D are either just guessing or couldn't figure out what the symbols represent or have a poor understanding of multiplication and division.

https://diagnosticquestions.com

Why do this activity?

This activity gives a good bridge between number work and algebra and learners can work on it without any algebraic notation. This is a pre-algebra task that challenges learners to reason about several unknowns, to look for ways to record the information given and to use the information given to find the unknowns. It introduces learners to the sort of manipulations that can be used to solve simultaneous equations. Later the activity can be used to progress from words to formulas.

Learning objectives

In doing this activity students will have an opportunity to:
1. develop logical reasoning and written and oral communication skills;
2. find their own methods for solving simultaneous equations without using any algebraic notation or formal procedures.

Generic competences

We need to prepare children for a job market where existing knowledge and skills have limited value unless they can be applied in novel ways to produce new knowledge that solves today's complex problems to improve the quality of life for all.
In doing this activity students will have an opportunity to interpret and solve problems.

Suggestions for teaching

Tell the learners that: "This is a really interesting problem because it can be solved in lots of different ways, make your choice about where to start." "Can you find the missing total that should go where the question mark has been put?"
Finish the lesson by inviting learners to the board to share their answers and explain their methods.

Key questions

- Compare the symbols in the four equations, which symbols are not the same and what are the
- What can you deduce by comparing the hexagon in the first and the second equations with the hexagon in the last equation?
- What can you deduce by comparing the bananas in the second and the third equations with the bananas in the last equation?
- Could you work out the value of the hexagon in the first equation?
- How could you then work out the value of the bananas in the second equation?
- If you could work out the values of the bananas in the second equation, how could you then work out the value of the clock in the third equation?
- What are the values of the banana, hexagon and clock symbols in the last equation?

Follow up

Click this link for a similar puzzle: https://aiminghigh.aimssec.ac.za/grades-7-and-8-whats-it-worth/

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and up to Secondary 5 in East Africa. New material will be added for Secondary 6.
For resources for teaching A level mathematics see https://nrich.maths.org/12339
Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is **beyond** the school curriculum for Grade 12 SA.

	Lower Primary or Foundation Phase Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 14	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6