In the window of Bradley's Bicycle Bazaar there are some unicycles, some bicycles and some tricycles. Laura sees that there are seven saddles in total, thirteen wheels in total and more bicycles than tricycles.

How many unicycles are in the window?

The positive integers from 1 to 150 inclusive are placed in a 10 by 15 grid so that each cell contains exactly one integer. Then the multiples of 3 are given a red mark, the multiples of 5 are given a blue mark, and the multiples of 7 are given a green mark.
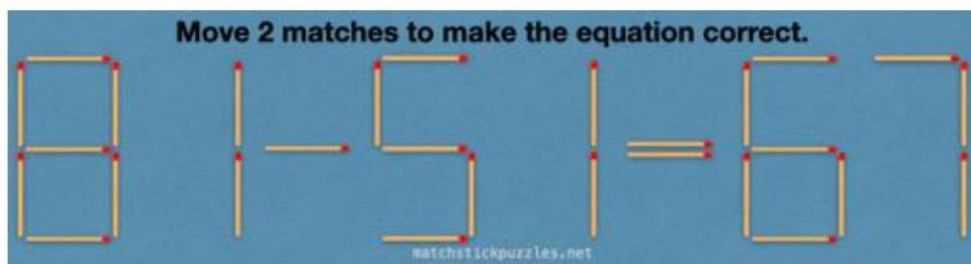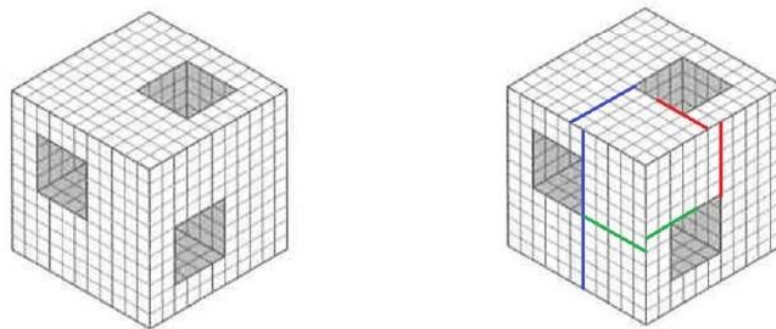
How many cells have more than 1 mark?

A large solid cube is cut into two pieces by a single plane cut. How many of the following four shapes could be the shape of the cross-section formed by the cut?
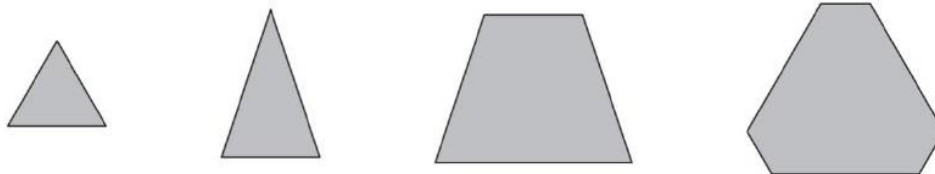
When freezing, water increases its volume by 1/11. By what part of its volume will ice decrease when it melts and turns back into water?

c) Just enough little cubes are then removed to allow a 4cm × 4cm × 4cm cube to pass through a third way. What is the volume of this final object? (Look *very* carefully at the diagram.)

Move 2 matches to make the equation correct.

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The length of an arc of a circle is 15 cm. The corresponding sector area is 150 cm^2.

Find

a)   the **radius** of the circle

b)   the **angle** (measured either in degrees or radians) subtended at the centre of the circle by the arc.

Replace the letters with digits to make the equation true.

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NAME THEIR WIVES A man left a legacy of $1,000.00 to three relatives and their wives. The wives received together $396.00. Jane received $10.00 more than Catherine, and Mary received $10.00 more than Jane. John Smith was given just as much as his wife, Henry Snooks got half as much again as his wife, and Tom Crowe received twice as much as his wife. What was the Christian name of each man's wife?

HORSES AND BULLOCKS A dealer bought a number of horses at $344.00 each, and a number of bullocks at $265.00 each. He then discovered that the horses had cost him in all $33.00 more than the bullocks. Now, what is the smallest number of each that he must have bought?

FEEDING THE MONKEYS

A man went to the zoo monkey house with a bag of nuts. He found that if he divided them equally among the eleven monkeys in the first cage he would have one nut over; if he divided them equally among the thirteen monkeys in the second cage there would be eight left; if he divided them among the seventeen monkeys in the last cage three nuts would remain. He also found that if he divided them equally among the forty-one monkeys in all three cages, or among the monkeys in any two cages, there would always be some left over. What is the smallest number of nuts that the man could have had in his bag?

THE SWARM OF BEES Here is an example of the elegant way in which Bhaskara, in his great work, Lilivati, in 1150, dressed his little puzzles: The square root of half the number of bees in a swarm has flown out upon a jessamine bush; eight-ninths of the whole swarm has remained behind; one female bee flies about a male that is buzzing within the lotus flower into which he was allured in the night by its sweet odor, but is now imprisoned in it. Tell me the number of bees.

THE ORCHARD PROBLEM A market gardener was planting a new orchard. The young trees were arranged in rows so as to form a square, and it was found that there were 146 trees unplanted. To enlarge the square by an extra row each way he had to buy 31 additional trees. How many trees were there in the orchard when it was finished?