

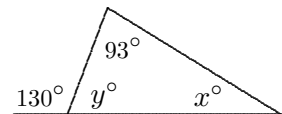
The University of the West Indies
The 2019 Junior Mathematical Olympiad

SOLUTIONS FOR FIRST ROUND EXAMINATION, GRADES 5 AND 6
TUESDAY, FEBRUARY 19, 2019

1. We have $2 \times 0 + 1 \times 9 = 0 + 9 = 9$.

2. If x is the number, then $\frac{1}{2}(x) = 32$. Thus $x = 64$. Twice the same number is $2 \times 64 = 128$.

3. Since the angles with measure 130° and y° make a straight angle, $130 + y = 180$. Then $y = 50$. Since the sum of the angles in any triangle is 180° , we have $93 + 50 + x = 180$. Then $x = 37$.



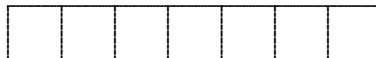
4. The machine produces 150 items in 60 seconds. This is $\frac{150}{60} = \frac{5}{2}$ items per second. In 10 seconds, the machine will produce $\frac{5}{2} \times \frac{10}{1} = \frac{50}{2} = 25$ items.

5. From the middle column, we see that each row, column, and diagonal will sum to $19 + 15 + 11 = 45$. From the top row, $14 + 19 + y = 45$. It follows that $y = 12$. From the diagonal containing x , we see that $x + 15 + 12 = 45$. Then $x = 8$.

| | | |
|-----|----|-----|
| 14 | 19 | y |
| | 15 | |
| x | 11 | |

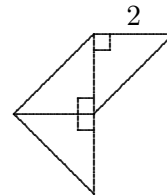
6. In four weeks, there will be 4 more boys and 8 more girls in the club. At that time, there will be 16 boys and 16 girls in all. There will be $16 + 16 = 32$ children in the club.

7. The 7 tables will be configured into a large table as shown below. A total of 16 children can sit at this table.



8. When Chris runs 100 m, this is equivalent to him running 5 m a total of 20 times. While he does this, Scott will run 4 m a total of 20 times. He will run 80 m in all.

9. Each triangle has base length 4 and a height of 4. Its area is $\frac{1}{2}(4)(4) = \frac{1}{2}(16) = 8$. Since the pentagon consists of three such triangles, its area is $3 \times 8 = 24$.



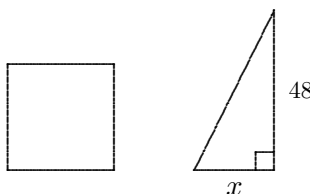
10. Since Juan won three games, a total of 3 points were deducted from Mary's score. Since she finished with a total of 5 points, this means that she would otherwise have had 8 points. Then Mary won 4 games in all. They played $3 + 4 = 7$ games in all.

11. The 4th symbol is \uparrow , and the sequence cycles after every 4 symbols. Then the 8th, 12th, 16th, and so on, up to the 2016th symbol are all \uparrow . Then the 2017th symbol is \rightarrow , the 2018th symbol is \downarrow , and the 2019th symbol is \leftarrow .

12. On one hand, $\frac{3 \times 6 \times 9}{3} = 6 \times 9 = 54$. On the other hand, $\frac{2 \times 6 \times 9}{2} = 6 \times 9 = 54$. Then if \square is replaced by $2 \times 6 \times 9$ we get a true equation.

13. Let A , B , and C stand for Ariel, Beth and Carol, respectively. The possible orders of finishing are ABC , ACB , BAC , BCA , CAB , and CBA . (Here, ABC represents a finish with Ariel first, Beth second, and Carol third, and so on.) There are 6 possible orders in all.

14. The square has side length 12, and its area is 144. Then the triangle has area 144 as well. The area of the rectangle containing the triangle is 288. Since the height of the rectangle is 48, we must have $x = 6$.



15. The numbers with at least two 7's appearing side-by-side are 77, 770, 177, 771, 277, 772, 377, 773, 477, 774, 577, 775, 677, 776, 777, 877, 778, 977, and 779. There are 19 such numbers in all.