

Math Kangaroo: Grade 5-6, 2013

Sunghee Yun

January 18, 2020

1. (E)
2. (C)
3. (C)
4. (B)
5. (E)
6. (B)
7. (B)
8. (E)
9. (C)
10. (D)
11. (C)
12. (C)
13. (D)
14. (B)
15. (A)

Solution: $13 (1\text{-by-}1) + 4 (2\text{-by-}2) + 5 (3\text{-by-}3) + 4 (4\text{-by-}4) + 1 (5\text{-by-}5) = 24$

16. (D)
17. (D)
18. (A)

Solution: $(10, 60), (11, 61), \dots, (49, 99)$

19. (C)
20. (D)
21. (A)
22. (D)
23. (B)

Solution:

A	B	A	B
A	B	B	A
A	A	A	B
B	B	B	B

24. (A)

25. (B)

26. ()

27. (B)

28. (E)

Solution: One possibility is all of them were liars. Another possibility is that 1006 of them were liars and 1007 of them were knights. Therefore there are at least two possibilities.

29. (D)

Solution:

$$(a, b, c) \rightarrow (b + c, a + c, a + b)$$

The maximum difference from $(b + c, a + c, a + b)$ is $\max\{|(b + c) - (a + c)|, |(b + c) - (a + b)|, |(a + c) - (a + b)|\} = \max\{|b - a|, |c - a|, |c - b|\}$, which is the maximum difference from (a, b, c) . Therefore the “changesum” procedure does not change the maximum difference.

30. (B)

Solution:

$$4 \times (1 + 2 + 3 + 4 + 5 + 6) - 2 \times (1 + 1 + 3 + 3) = 4 \times 21 - 2 \times 8 = 68$$