23. Don and Juan had a total of x cherries, but then Don ate 27 fewer than x cherries and Juan ate 11 fewer than x cherries. If they each ate at least 10 cherries, and there was at least one cherry that wasn’t eaten, then x = 
A) 37  B) 38  C) 39  D) 49

24. Of the 200 pets for sale at Pip’s Pets, a have scales, b have gills, and c have both. How many of the pets have neither scales nor gills? A) 2019 B) 50 C) 105 D) 200

25. The product of two numbers is 144, and the lesser of the two is 6 less than three times the greater. What is the greater of the two numbers?
A) 18  B) 8  C) -6  D) -24

26. If x and y are positive numbers and x + y = 2, which of the following could be the value of 20x + 50y? A) 35  B) 65  C) 105  D) 140

27. Iko’s rectangular vegetable garden is 2x m wide and 3x m long. She wants to plant flowers to form a border of uniform width around the vegetable garden, and measures that the border will cover 14x² m². How wide is the border of flowers going to be? A) 0.5x m  B) x m  C) 1.5x m  D) 2x m

28. If 10²⁰¹⁹ – 2019 is written as an integer in decimal form, what is the sum of its digits? A) 2019  B) 18160  C) 18161  D) 18169

29. Tom mixes x kg of cake mix that is 10% sugar with y kg of cake mix that is 20% sugar. If the resulting mixture is z% sugar, then the ratio of x to y is A) (20 – z):(z – 10)  B) (10 – z):(z + 20)  C) (z + 10):(20 – z)  D) (z + 20):(10 – z)

30. If x, y and z are prime, what is the product of all whole-number divisors of the product xyz? A) xyz  B) x²y²z²  C) x³y³z³  D) x⁴y⁴z⁴

The end of the contest
1. If \( a = 2, r = 0, t = 1, \) and \( s = 9, \) then \( s + t + a + r + t = \)
   A) 0   B) 12   C) 13   D) 21

2. There were \( a \) ants in my ant farm, but then \( 3 \) ants escaped! If each ant has 6 legs, the ants remaining have a combined total of \( \text{?} \) legs.
   A) \( 6a - 3 \)   B) \( 6(a - 3) \)   C) \( 6a - 3a \)   D) \( a^6 - 3 \)

3. \( 6x^2 - 5 + 4x - 3 + 2x^2 - 1 + 2x - 3 + 4x^2 - 5 + 6x = \)
   A) \( 36x - 17 \)   B) \( 24x - 9 \)   C) \( 12x^2 + 12x - 12 \)   D) \( 12x^2 + 12x - 17 \)

4. \((x - y)(x + y) = \)
   A) \( x^2 - y^2 \)   B) \( x^2 - 2xy + y^2 \)   C) \( x^2 + 2xy + y^2 \)   D) \( x^2 + y^2 \)

5. \((x - y)(x + y)(x - y) = \)
   A) \( x^3 - y^3 \)   B) \( x^3 - x^2y - xy^2 + y^3 \)   C) \( x^3 + y^3 \)   D) \( x^3 - x^2y + xy^2 + x^3 \)

6. Which of the following is negative for all real values of \( s \)?
   A) \(-s^3 - 1\)   B) \((-s)^3 - 1\)   C) \(-s^2 - 1\)   D) \((-s)^2 - 1\)

7. \((x^2 - 1)(x^2 - 2)(x^2 - 3)(x^2 - 4) = 0\) has how many integer solutions?
   A) 2   B) 4   C) 6   D) 8

8. If \( x, y, \) and \( z \) are distinct prime numbers, which of the following is the least common multiple of \( x^2y^3z^4 \) and \( x^4y^3z^2 \)?
   A) \( x^8y^9z^8 \)   B) \( x^6y^6z^6 \)   C) \( x^4y^4z^4 \)   D) \( x^2y^2z^2 \)

9. \((x^3 + x^3)^3 = \)
   A) \( 2x^{18} \)   B) \( 8x^{18} \)   C) \( 8x^{27} \)   D) \( x^{54} \)

10. In my big jar of jellybeans there are exactly \( 3b \) red beans, \( 5b \) green beans, and \( 6b \) orange beans, and no others. There could be a total of \( \text{?} \) beans.
    A) 35   B) 42   C) 60   D) 90

11. What is the sum of all solutions to \( |2x - 2.5| = 4? \)
    A) 2   B) 2.5   C) 3.75   D) 4

12. The positive difference between the two roots of \( x^2 - 3x - 28 = 0 \) is
    A) 3   B) 4   C) 7   D) 11

13. Today Li turned 42 and Mae turned 8. How old will Mae be when Li is exactly three times Mae’s age?
    A) 9   B) 17   C) 26   D) 51

14. If a crate of lightbulbs contains \( b \) boxes, and each box contains \( p \) packages, how many bulbs are in 3 crates if each package holds 4 bulbs?
    A) \( 12bp \)   B) \( \frac{3bp}{4} \)   C) \( \frac{4bp}{3} \)   D) \( \frac{bp}{12} \)

15. Avi and Bea were building sand castles all day. Avi had built three times as many castles as Bea, but then a wave destroyed 3 of Avi’s castles while Bea built 1 more. At that point the ratio of Avi’s castles to Bea’s was 5:2. Avi had built \( \text{?} \) castles before the wave hit.
    A) 11   B) 12   C) 30   D) 33

16. If \( 135 \times 46 = a, \) then \( 135 \times 48 = \)
    A) \( a + 2 \)   B) \( a + 92 \)   C) \( a + 94 \)   D) \( a + 270 \)

17. If \( 3x + 8y = 21 \) and \( 8x + 3y = 23, \) then \( x + y = \)
    A) 2   B) 4   C) 11   D) 22

18. If the hands on a circular clock start at midnight, what number will the hour hand point to 1000 hours later?
    A) 2   B) 4   C) 8   D) 12

19. If \( x \) is an integer, what is the least possible value of \( \left| 20 - 7x \right| ? \)
    A) 1   B) 2   C) 3   D) 6

20. If Sy can shovel snow from half of a driveway in 2 hours, and Ty can shovel snow from one quarter of the driveway in 2 hours, how many minutes would it take them to shovel the whole driveway working together at their respective constant rates?
    A) 120   B) 160   C) 180   D) 360

21. Of the bottles that Viola collects, 80% are green. Of the green bottles, 30% held perfume and 45% held spices. If the remaining 25 green bottles held pills, How many bottles are in Viola’s collection?
    A) 75   B) 100   C) 120   D) 125

22. If \( x \neq 0 \) and \( 2x - \frac{y - 3x^2}{x} = \frac{4}{x}, \) then \( y = \)
    A) \( 4 - x^2 \)   B) \( 4 + x^2 \)   C) \( 5x^2 - 4 \)   D) \( 4 - 5x^2 \)