Answers

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

23.

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) $200 - a - b$ B) $200 - c$ C) $200 - a - b - c$ D) $200 - a - b + c$

24.

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

25.

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

26.

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 $14x^2$ m^2. How wide is the border of flowers going to be?

A) $0.5x$ m   B) x m   C) $1.5x$ m   D) $2x$ m

27.

28. If $10^{2019} - 2019$ is written as an integer in decimal form, what is the sum of its digits?

A) 2019   B) 18160   C) 18161   D) 18169

28.

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) $(10 - z):(z + 20)$
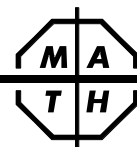C) $(z + 10):(20 - z)$ D) $(z + 20):(10 - z)$

29.

30. If x, y and z are prime, what is the product of all whole-number divisors of the product xyz?

A) xyz B) $x^2y^2z^2$ C) $x^3y^3z^3$ D) $x^4y^4z^4$

30.

The end of the contest ✍🏼 **A**

M A T H

ALGEBRA COURSE 1 CONTEST

2018-2019 Annual Algebra Course 1 Contest

Spring, 2019

A

Instructions

- **Time**   Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.

- **Scores**   Please remember that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*

- **Format and Point Value**   This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level _____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right
before you return this paper to the student.   *Student's Score:* _____

The school's top scorer will receive the book *Math Contests—High School (Vol. 4).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Answers

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

1.

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 _?_ legs.

    A) $6a - 3$ B) $6(a - 3)$ C) $6a - 3a$ D) $a^6 - 3$

2.

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) $12x^2 + 12x - 17$

3.

4. $(x - y)(x + y) =$

    A) $x^2 - y^2$ B) $x^2 - 2xy + y^2$ C) $x^2 + 2xy + y^2$ D) $x^2 + y^2$

4.

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) $x^3 + x^2y + xy^2 + y^3$

5.

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) $(-s)^2 - 1$

6.

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

7.

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) $x^4y^3z^4$ D) $x^2y^3z^2$

8.

9. $((x^3 + x^3) \times x^3)^3 =$

    A) $2x^{18}$ B) $8x^{18}$ C) $8x^{27}$ D) x^{54}

9.

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 _?_ beans.

    A) 35   B) 42   C) 60   D) 90

10.

11. What is the sum of all solutions to $|2x - 2.5| = 4$?

    A) 2   B) 2.5   C) 3.75   D) 4

11.

12. The positive difference between the two roots of $x^2 - 3x - 28 = 0$ is

    A) 3   B) 4   C) 7   D) 11

12.

Answers

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

13.

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) $\dfrac{3bp}{4}$ C) $\dfrac{4bp}{3}$ D) $\dfrac{bp}{12}$

14.

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 _?_ castles before the wave hit.

    A) 11   B) 12   C) 30   D) 33

15.

16. If $135 \times 46 = a$, then $135 \times 48 =$

    A) $a + 2$ B) $a + 92$ C) $a + 94$ D) $a + 270$

16.

17. If $3x + 8y = 21$ and $8x + 3y = 23$, then $x + y =$

    A) 2   B) 4   C) 11   D) 22

17.

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

18.

19. If x is an integer, what is the least possible value of $|20 - 7x|$?

    A) 1   B) 2   C) 3   D) 6

19.

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

20.

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

21.

22. If $x \neq 0$ and $2x - \dfrac{y - 3x^2}{x} = \dfrac{4}{x}$, then $y =$

    A) $4 - x^2$ B) $4 + x^2$ C) $5x^2 - 4$ D) $4 - 5x^2$

22.