23. A comedian who was not very funny told jokes to an audience. Each time he told a joke, half the audience left. If there were 16 people still in the audience at the start of the 5th joke, how many people were in the audience at the start of the first joke?

A) 64 B) 128 C) 192 D) 256 — 23.

24. What is the smallest possible 3-digit product of two primes, if the product is even?

A) 102 B) 104 C) 106 D) 108 — 24.

25. Inez wants to completely fill bags with candies. Each bag completely filled holds 75 candies, and Inez has 2022 candies all together. If Inez fills each bag completely before starting to fill the next one, how many candies will Inez have left over?

A) 0 B) 49 C) 51 D) 72 — 25.

26. How many integers less than 1000 have 2, 4, 8, and 16 as factors?

A) 0 B) 62 C) 125 D) 250 — 26.

27. In my desert town, we average 2 rainy months every 3-year period. What is the average number of dry months in a 24-year period?

A) 272 B) 240 C) 36 D) 16 — 27.

28. Every day, Ed falls asleep 14 hours after he wakes up for the day. Ed always sleeps for 8 hours at a time. If Ed fell asleep at 9 PM on Saturday, what time did he wake up the previous day?

A) 7 AM B) 8 AM C) 9 AM D) 10 AM — 28.

29. For how many 2-digit integers greater than 10 would reversing the digits create a greater 2-digit integer?

A) 20 B) 24 C) 28 D) 36 — 29.

30. The sum of the 3 digits of my passcode is 18. If all 3 digits are different, what is their greatest possible product?

A) 180 B) 192 C) 210 D) 216 — 30.

The end of the contest 5

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

2021-2022 Annual 5th Grade Contest

Spring, 2022

5

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—Grades 4,5,6 (Vol. 5).* 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.

Twenty-four books of past contests, *Grades 4, 5, & 6* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), *Grades 7 & 8* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), and *High School* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), are available, for $12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

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Answers

1. $20 + 20 + 20 + 20 + 20 = 22 + 22 + 22 + 22 + \_?\_$

   A) 10 B) 12 C) 20 D) 22

2. If 4 boxes can hold 124 hats, then 5 boxes can hold _?_ hats.

   A) 129 B) 155 C) 165 D) 175

3. $2022 \times 2 + 2022 \times 1 + 2022 \times 0 = 2022 \times \_?\_$

   A) 3 B) 2 C) 1 D) 0

4. Six dozen eggs is _?_ eggs more than three dozen eggs.

   A) 3 B) 12 C) 15 D) 36

5. Which of the following numbers is divisible by each of its digits?

   A) 434 B) 535 C) 636 D) 737

6. How many divisors of 16 are multiples of 4?

   A) 1 B) 2 C) 3 D) 4

7. I ran backwards for 12 minutes before tripping. For how many seconds did I run before tripping?

   A) 72 B) 720 C) 1200 D) 1260

8. $2 \times 4 \times 8 \times 16 \div 2 = 32 \times \_?\_$

   A) 16 B) 8 C) 4 D) 1

9. The perimeter of a square with prime side-lengths could be

   A) 32 B) 24 C) 16 D) 8

10. The number of months in 7 years equals the number of days in _?_ weeks.

    A) 7 B) 12 C) 19 D) 84

11. If the sum of 3 consecutive numbers is 9, the sum of the next 3 consecutive numbers is

    A) 18 B) 17 C) 15 D) 12

12. How many multiples of 3 are less than 3×2022?

    A) 2019 B) 2020 C) 2021 D) 6063

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Answers

13. I have an equal number of nickels and quarters. If the total value of my quarters is $5.00, what is the total value of my nickels?

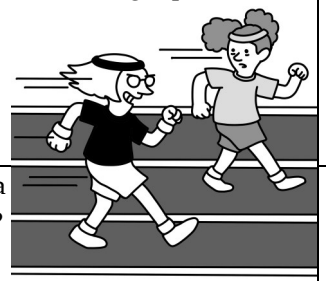
    A) $1.00 B) $2.00 C) $2.50 D) $3.00

14. The smallest possible sum of two primes whose difference is 2 is

    A) 5 B) 7 C) 8 D) 12

15. Jan walks twice as fast as I do. If we both start walking laps around the track at the same time, how many laps all together will Jan and I have walked by the time I finish 8 laps around the track?

    A) 8 B) 12 C) 16 D) 24



16. What is the greatest 2-digit integer that is a multiple of 3 and 4 but not a multiple of 8?

    A) 12 B) 84 C) 96 D) 98

17. The average age of my three cousins is 16 years. If the average age of my two oldest cousins is 18 years, how many years old is my youngest cousin?

    A) 12 B) 14 C) 16 D) 18

18. How many multiples of 7 less than 1000 are even?

    A) 71 B) 142 C) 213 D) 499

19. If each of 4 rams in a pen butted heads with every other ram once, there were _?_ head-butts. (Two rams head-butting is 1 head-butt.)

    A) 12 B) 8 C) 6 D) 4

20. The number of times Ike watched his favorite video was 2 more than a multiple of 5. If Ike watches the video 2021 more times, the total number of times he will have watched could be

    A) 2222 B) 2224 C) 2227 D) 2228

21. The greatest odd divisor of $2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9$ is

    A) 105 B) 315 C) 945 D) 2835

22. My 7-digit bank account number has 5 different digits. What is the greatest possible sum of the digits of my bank account number?

    A) 25 B) 48 C) 53 D) 63

Go on to the next page 5

	Answers
23. Half the audience left after each joke was told. If there were 16 people in the audience at the start of the 5th joke, there were 32 people at the start of the 4th joke, 64 at the start of the 3rd, 128 at the start of the 2nd, and **256** at the start of the 1st joke. A) 64 B) 128 C) 192 D) 256	23. D
24. The smallest possible 3-digit even product of two primes is $2 \times 53 = \mathbf{106}$. A) 102 B) 104 C) 106 D) 108	24. C
25. Inez wants to fill each bag with 75 candies until she can't completely fill another bag. If Inez has 2022 candies, she can completely fill $2022 \div 75 = 26\text{R}72$. Inez will have 72 candies left over after she completely fills 26 bags. A) 0 B) 49 C) 51 D) 72	25. D
26. Just use 16: $1000 \div 16 = 62\text{R}5$; there are **62** such integers. A) 0 B) 62 C) 125 D) 250	26. B
27. If the average number of rainy months in 3 years is 2, the average number of dry months is 34. For 24 years, the average is $(24 \div 3) \times 34 = \mathbf{272}$. A) 272 B) 240 C) 36 D) 16	27. A
28. Ed falls asleep 14 hours after he wakes up. Ed sleeps for 8 hours at a time. If Ed fell asleep at 9 PM on Saturday, he woke up 14 hours before, at 7 AM. On Friday he woke up (8+14) hours earlier, at **9 AM**. A) 7 AM B) 8 AM C) 9 AM D) 10 AM	28. C
29. If the tens digit is 1, 2, 3, 4, 5, 6, 7, or 8, there are 8, 7, 6, 5, 4, 3, 2, or 1 reversed numbers that are larger. That's a total of **36** such integers. A) 20 B) 24 C) 28 D) 36	29. D
30. The product of 3 digits whose sum is 18 is greatest when the 3 digits are as close together as possible. The product of 7, 6, and 5 is **210**. A) 180 B) 192 C) 210 D) 216	30. C

The end of the contest **5**

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FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2022

5

Directions for Grading

- **Date** You may give this contest any time after April 15. The *4th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Instructions for optionally submitting results are included on a separate sheet entitled "*Using the Score Report Center*."
- **Urgent questions?** Write to comments@mathleague.com, or call 1-201-568-6328 or 1-516-365-5656.
- **Scores** Remind students 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!*
- **Solutions** Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Awards** The original contest package contained 1 book award (and a bookplate you should affix to the book's inside front cover) for the 1st place student. We also enclosed 5 *Certificates of Merit*—1 for each runner-up, plus extras for ties.
- **Additional Book Awards & Additional Certificates** If you want to give more than 1 book award, you may purchase additional books as described below. Do you need more Certificates of Merit? If so, send your name, school, and school mailing address to our mailer at: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670***, and *include a self-addressed, stamped envelope (**2 stamps required**) large enough to hold certificates.*

The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 5)*. 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. Special "bumper sticker" awards are included for high-scoring students.

Twenty-four books of past contests, *Grades 4, 5, & 6* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), *Grades 7 & 8* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), and *High School* (*Vols. 1, 2, 3, 4, 5, 6, 7, 8*), are available, for $12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

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	Answers
1. $20 + 20 + 20 + 20 + 20 = 100 = 88 + \underline{\mathbf{12}}$. A) 10 B) 12 C) 20 D) 22	1. B
2. One box holds $124 \div 4 = 31$ hats; 5 boxes hold $5 \times 31 = \underline{155}$ hats. A) 129 B) 155 C) 165 D) 175	2. B
3. $2022 \times 2 + 2022 \times 1 + 2022 \times 0 = 2022 \times (\underline{\mathbf{2+1+0}})$. A) 3 B) 2 C) 1 D) 0	3. A
4. 6 dozen eggs is 3 dozen eggs or **36** eggs more than 3 dozen eggs. A) 3 B) 12 C) 15 D) 36	4. D
5. Since 636 is divisible by both 3 and 6, choice **C** is correct. A) 434 B) 535 C) 636 D) 737	5. C
6. The divisors of 16 that are multiples of 4 are 4, 8 and 16. There are **3**. A) 1 B) 2 C) 3 D) 4	6. C
7. I ran backwards for 12 minutes. Since each minute is 60 seconds, that's a total of $12 \times 60 =$ **720** seconds. A) 72 B) 720 C) 1200 D) 1260	7. B
8. $2 \times (4 \times 8) \times 16 \div 2 = (4 \times 8) \times 16 = 32 \times \underline{\mathbf{16}}$. A) 16 B) 8 C) 4 D) 1	8. A
9. Divide each answer choice by 4; only $\mathbf{8} \div 4 = 2$ is a prime. A) 32 B) 24 C) 16 D) 8	9. D
10. The number of months in 7 years is $12 \times 7 = 84$, and 84 is the number of days in $84 \div 7 = \underline{12}$ weeks. A) 7 B) 12 C) 19 D) 84	10. B
11. If the sum of 3 consecutive numbers is 9, the numbers are 2, 3, and 4. The sum of the next 3 consecutive numbers is $5 + 6 + 7 =$ **18**. A) 18 B) 17 C) 15 D) 12	11. A
12. The **2021** multiples 3×1, 3×2, …, 3×2020, 3×2021 are less than 3×2022. A) 2019 B) 2020 C) 2021 D) 6063	12. C

Go on to the next page ➠ 5

	Answers
13. If the total value of my quarters is \$5.00, I have $500 \div 25 = 20$ quarters. My 20 nickels are worth $20 \times \$.05 =$ **\$1.00**. A) \$1.00 B) \$2.00 C) \$2.50 D) \$3.00	13. A
14. The smallest sum of two primes whose difference is 2 is $3 + 5 =$ **8**. A) 5 B) 7 C) 8 D) 12	14. C
15. Jan walks twice as fast as I do. By the time I finish 8 laps around the track, Jan will have walked 16 laps. Together Jan and I will have walked $8 + 16 =$ **24** laps around the track. A) 8 B) 12 C) 16 D) 24	15. D
16. The greatest 2-digit integer that's a multiple of 3 and 4 but not of 8 is $3 \times 4 \times 7 =$ **84**. A) 12 B) 84 C) 96 D) 98	16. B
17. The average age of my 3 cousins is 16 years. The sum of their ages is $3 \times 16 = 48$. If the average age of my 2 oldest cousins is 18, the sum of their ages is $2 \times 18 = 36$. My youngest cousin's age is $48 - 36 =$ **12**. A) 12 B) 14 C) 16 D) 18	17. A
18. All even multiples of 7 are divisible by 14; $1000 \div 14 =$ **71**R6. A) 71 B) 142 C) 213 D) 499	18. A
19. Call the rams A, B, C, and D. Then these are the possible headbutts: A-B, A-C, A-D, B-C, B-D, and C-D. That's **6** headbutts. A) 12 B) 8 C) 6 D) 4	19. C
20. Ike watched his favorite video 2 more times than a multiple of 5. A number that is 2 more than a multiple of 5 has a ones digit of 2 or 7. Adding 2021 gives a ones digit of 3 or 8. A) 2222 B) 2224 C) 2227 D) 2228	20. D
21. Greatest odd divisor of $2 \times 3 \times 4 \times 5 \times (2 \times 3) \times 7 \times 8 \times 9$ is $3 \times 5 \times 3 \times 7 \times 9 =$ **2835**. A) 105 B) 315 C) 945 D) 2835	21. D
22. My 7-digit account number has 5 different digits. There could be 3 9s in addition to 8, 7, 6, and 5. Their sum is $9+9+9+8+7+6+5 =$ **53**. A) 25 B) 48 C) 53 D) 63	22. C

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