SIXTH GRADE MATHEMATICS CONTEST

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

2009-2010 Annual 6th Grade Contest

Tuesday, February 16 or 23, 2010

6

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You might be *unable* to finish all 40 questions in the 30 minutes 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 30 points (75% correct). Students with half that, 15 points, *should be commended!*
- **Format, Point Value, & Eligibility** Every answer is an A, B, C, or D. Write answers in the *Answers* column. A correct answer is worth 1 point. Unanswered questions get no credit. You **may** use a calculator.

1. A spider has 8 legs and a tortoise has 4 legs. How many legs do 3 spiders and 3 tortoises have all together?

   A) 14 B) 17 C) 36 D) 42

2. ___?___ is divisible by 3.

   A) 2009 B) 2010 C) 2011 D) 2012

3. $4 \times 4 \times 2 \times 2 \times 4 \times 0 =$

   A) 6400 B) 64 C) 12 D) 0

4. A square has a side of length 5. What is its perimeter?

   A) 10 B) 20 C) 25 D) 50

5. $13 + (15 + 17) =$

A) $(13 + 15) + 17$
B) $(13 + 15) + (13 + 17)$
C) $(13 \times 15) + (13 \times 17)$
D) $13 \times (15 + 17)$

6. A Ferris wheel costs 50¢ per ride and a roller coaster costs $1.25 per ride. The total cost of 5 Ferris wheel rides and 10 roller coaster rides is

A) $13
B) $14
C) $15
D) $16

7. $\frac{1}{8} + \frac{2}{8} + \frac{3}{8} =$

A) $\frac{3}{4}$
B) $\frac{3}{8}$
C) $\frac{3}{16}$
D) $\frac{5}{24}$

8. Yesterday the train came at 8 AM, and today it came at 3 PM. How many hours passed between yesterday's and today's arrivals?

A) 7
B) 19
C) 31
D) 35

9. $2008 + 2009 + 2010 + 2011 + 2012 =$

A) 10050 B) 10051 C) 10052 D) 10053

10. How many prime factors does 42 have?

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

11. Half the sum of the degree-measures of the angles of an isosceles triangle is

A) 45 B) 90 C) 180 D) 360

12. Which of the following numbers is *not* the square of a whole number?

A) 100 B) 144 C) 196 D) 200

13. The greatest common factor of 23 and 24 is

A) 20 B) 12 C) 2 D) 1

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14. $6 \times 6 \times 6 \times 6 \times 6 =$

A) 6×5 B) 5^6 C) 6^5 D) 4^6

15. Amy's age is three times the age of her little sister Bo. Her Uncle Charles' age is three times the sum of the ages of Amy and Bo. If Amy is 18, how old is Charles?

A) 54 B) 60 C) 66 D) 72

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16. 5 = 10% of 20% of

A) 1000 B) 530 C) 500 D) 250

17. How many even numbers are there between 2011 and 2099?

A) 44 B) 45 C) 88 D) 89

18. What is the average of 80, 83, 86, 89, and 92?

A) 85 B) 85.5 C) 86 D) 86.5

19. In a class of 18 students, 6 are wearing jeans. What is the ratio of students wearing jeans to students *not* wearing jeans?

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

20. The sum of two numbers is 12, and their product is 35. The larger of the two numbers is

A) 8 B) 7 C) 6 D) 5

21. $(123 \times 8) + (123 \times 9) + (123 \times 10) + (123 \times 11)$ is divisible by

A) 9 B) 8 C) 7 D) 6

22. When twice the perimeter of a square is tripled, the result is 72. What is the area of the square?

A) 3 B) 9 C) 12 D) 16

23. Of the following numbers, which is the largest number?

A) 1^5 B) 2^4 C) 3^3 D) 4^2

24. On every odd-numbered day in May, Dave ran for 15 minutes. On every even-numbered day in May, he ran for 44 minutes. For how many *hours* did he run in May?

A) 15 B) 30 C) 60 D) 900

25. $5 \times \sqrt{5} \times 5 \times \sqrt{5} =$

A) $5 \times 5 \times 25$ B) $5 \times 5 \times 5$

C) $5 \times 5 \times 2$ D) 5×5

26. The product of two whole numbers is 30.
What is the least possible value of their sum?

A) 10 B) 11 C) 13 D) 31

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27. $222 \times 66 = 333 \times 44 \times$?

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

28. $(8 + 10 + 12) + (8 + 10 - 12) + (8 + 12 - 10) + (10 + 12 - 8) =$

A) $(8+10+12)$ B) $2 \times (8+10+12)$ C) $3 \times (8+10+12)$ D) $4 \times (8+10+12)$

29. If a whole number between 100 and 999 has three different non-zero digits, what is the least possible value of the sum of its digits?

A) 7 B) 6 C) 4 D) 3

30. In 20 years, Ed will be 31 and Di will be 35. The sum of their ages now is

A) 26 B) 46 C) 86 D) 106

31. What month is 1000 months after March?

A) March B) May C) June D) July

32. The ones digit of the product $123 \times 456 \times 789$ is

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

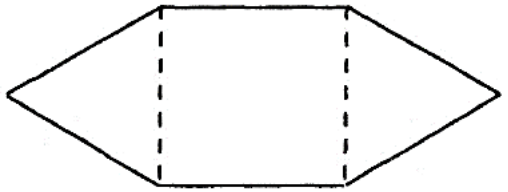
33. An equal number of pennies, nickels, and dimes have a combined total value of \$2.40. The total value of the nickels is

A) 15¢ B) 50¢ C) 75¢ D) 95¢

34. $(2010 - 2005) \times (2005 - 2000) \times (2000 - 1995) \times \ldots \times (10 - 5) \times (5 - 0) =$

A) 5^{402} B) 5^{401} C) 5×402 D) 5×401

35. Two equilateral triangles share sides with a square, as shown. If a side of the square has a length of 4, what is the perimeter of the figure?



A) 48 B) 40 C) 32 D) 24

36. If there are 420 students in my school, then the ratio of boys to girls in my school *cannot* be

A) 3:7 B) 5:9 C) 11:14 D) 17:18

37. 300% of 300 = ___?___ % of 3000 A) 10 B) 25 C) 30 D) 50

38. Bricks weigh 3 kg or 7 kg each. Cy picks up at least one brick of each size. The total weight of bricks he picks up *cannot* be

A) 21 kg B) 27 kg
C) 30 kg D) 39 kg

39. The smallest prime number that is a factor of $(1 \times 2 \times 3 \times \ldots \times 30) + 1$ must be

A) less than 10 B) between 10 & 20
C) between 20 & 30 D) greater than 30

40. How many whole numbers from 1 through 500 have a 3 as the hundreds digit or ones digit, but *not* as both?

A) 130 B) 140 C) 150 D) 160

	Answers
28. Each number is added 3 times and subtracted once, so B is correct. A) (8+10+12) B) 2 × (8+10+12) C) 3 × (8+10+12) D) 4 × (8+10+12)	28. B
29. The number 123 is a whole number between 100 and 999 that has three different non-zero digits; the sum of its digits is 1 + 2 + 3 = 6. A) 7 B) 6 C) 4 D) 3	29. B
30. Ed is 31 − 20 = 11, and Di is 35 − 20 = 15. The sum of their ages is 11 + 15 = 26. A) 26 B) 46 C) 86 D) 106	30. A
31. Since 1000 ÷ 12 has R4, it's 4 months after Mar. A) March B) May C) June D) July	31. D
32. Multiply the ones digits: 3 × 6 × 9 = 162. A) 1 B) 2 C) 3 D) 4	32. B
33. The value of one of each coin is (1+5+10)¢ = 16¢. Since \$2.40÷16¢ = 15, there are 15 of each coin. The value of 15 nickels is 15 × 5¢ = 75¢. A) 15¢ B) 50¢ C) 75¢ D) 95¢	33. C
34. Each difference is 5. There are 2010÷5 fives = 402 fives = 5^{402}. A) 5^{402} B) 5^{401} C) 5 × 402 D) 5 × 401	34. A
35. Two equilateral triangles share sides with a square as shown. The figure has 6 sides of length 4, so the perimeter is 6 × 4 = 24. A) 48 B) 40 C) 32 D) 24	35. D
36. There are 420 students in my school. The ratio of boys to girls in my school *cannot* be 11:14 since 11 + 14 = 25 is not a factor of 420. A) 3:7 = 126:294 B) 5:9 = 150:270 C) 11:14 D) 17:18 = 204:216	36. C
37. 3×300 = 900, and 900÷3000 = 0.3 = 30%. A) 10 B) 25 C) 30 D) 50	37. C
38. See choices. One of each brick weighs 10 kg. Subtract 10 repeatedly from each choice until the difference is 0 or divisible by 3 or 7. A) 21 kg B) 27 kg = 2×3+3×7 C) 30 kg = 3×3+3×7 D) 39 kg = 6×3 + 3×7	38. A
39. If (1×2×3×…×30)+1 is divided by 2 or 3 or 5 or … or 29, the remainder is always 1. A) less than 10 B) between 10 & 20 C) between 20 & 30 D) greater than 30	39. D
40. Each block, 1–99, 100–199, 200–299, 400–500, has 10 such numbers. From 300 to 399, there are 100−10 = 90 numbers. In all, there are 40 + 90 = 130 numbers. A) 130 B) 140 C) 150 D) 160	40. A

The end of the contest

Information & Solutions

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6

Contest Information

- **Solutions** Turn the page for detailed contest solutions (written in the question boxes) and letter answers (written in the *Answer Column* to the right of each question).
- **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 30 points (75% correct); students with half that, 15 points, *deserve commendation!*
- **Answers and Rating Scales** Turn to page 151 for the letter answers to each question and the rating scale for this contest.

	Answers
1. The 3 spiders have $3 \times 8 = 24$ legs. The 3 tortoises have $3 \times 4 = 12$ legs. That's 36 legs all together. A) 14 B) 17 C) 36 D) 42	1. C
2. Only 2010's digit sum is a multiple of 3. A) 2009 B) 2010 C) 2011 D) 2012	2. B
3. One factor is 0, so the product is 0. A) 6400 B) 64 C) 12 D) 0	3. D
4. The perimeter of a square is 4 × length of a side = $4 \times 5 = 20$. A) 10 B) 20 C) 25 D) 50	4. B
5. A sum does not change when the addends are regrouped. A) $(13 + 15) + 17$ B) $(13 + 15) + (13 + 17)$ C) $(13 \times 15) + (13 \times 17)$ D) $13 \times (15 + 17)$	5. A
6. The cost of 5 rides on the Ferris wheel is $5 \times 50¢ = \$2.50$. The cost of 10 rides on the roller coaster is $10 \times \$1.25 = \$12.50$. The total cost is \$15. A) \$13 B) \$14 C) \$15 D) \$16	6. C
7. $\frac{1}{8} + \frac{2}{8} + \frac{3}{8} = \frac{1+2+3}{8} = \frac{6}{8} = \frac{3}{4}$. A) $\frac{3}{4}$ B) $\frac{3}{8}$ C) $\frac{3}{16}$ D) $\frac{5}{24}$	7. A
8. From 8 AM yesterday until 8 AM today is 24 hours. From 8 AM till noon is 4 hours, and from noon till 3 PM is 3 hours. In all, it's $24 + 4 + 3 = 31$ hours. A) 7 B) 19 C) 31 D) 35	8. C
9. $2008 + 2009 + 2010 + 2011 + 2012 = 5 \times 2010$. A) 10050 B) 10051 C) 10052 D) 10053	9. A
10. Since $42 = 2 \times 3 \times 7$, 42 has 3 prime factors. A) 1 B) 2 C) 3 D) 4	10. C
11. The sum of the degree-measures in *any* triangle is 180. Half of 180 is 90. A) 45 B) 90 C) 180 D) 360	11. B
12. As shown below, all choices except 200 are perfect squares. A) $100 = 10^2$ B) $144 = 12^2$ C) $196 = 14^2$ D) 200	12. D
13. The only common factor of any two consecutive whole numbers is 1. A) 20 B) 12 C) 2 D) 1	13. D
14. The number of factors of 6 equals the exponent of 6, so we get 6^5. A) 6×5 B) 5^6 C) 6^5 D) 4^6	14. C

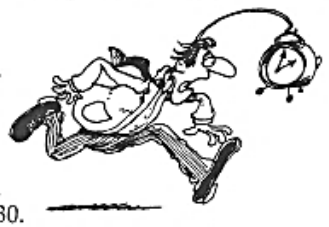
Go on to the next page ➡ 6

	Answers
15. Amy's age is three times her little sister Bo's age, so Bo is $18 \div 3 = 6$. Since Charles' age is three times the sum of Amy's and Bo's ages, Charles' age is $3 \times (18 + 6) = 3 \times 24 = 72$. A) 54 B) 60 C) 66 D) 72	15. D
16. $0.1 \times 0.2 = 0.02 = 1/50$, and $1/50 \times 250 = 5$. A) 1000 B) 530 C) 500 D) 250	16. D
17. There are 5 in each block of 10 up to 2091. There are 4 more up to 2099. A) 44 B) 45 C) 88 D) 89	17. A
18. The average of five equally-spaced numbers is the middle number. A) 85 B) 85.5 C) 86 D) 86.5	18. C
19. If 6 students are wearing jeans, then $18 - 6 = 12$ are not. The ratio of students wearing jeans to students *not* wearing jeans is 6:12 = 1:2. A) 1:2 B) 1:3 C) 2:3 D) 2:1	19. A
20. The sum of 2 numbers is 12, and their product is 35. The numbers are 5 and 7. The larger of the two numbers is 7. A) 8 B) 7 C) 6 D) 5	20. B
21. Since 123 is divisible by 3, and $(8+9+10+11) = 38$ is even, 3×2 is a factor. A) 9 B) 8 C) 7 D) 6	21. D
22. Since twice the perimeter of a square, tripled, is 72, the perimeter is $(72 \div 3) \div 2 = 12$. One side's length is $12 \div 4 = 3$, so the square's area is 9. A) 3 B) 9 C) 12 D) 16	22. B
23. Choice C is correct as shown below. A) $1^5 = 1$ B) $2^4 = 16$ C) $3^3 = 27$ D) $4^2 = 16$	23. C
24. May has 16 odd-numbered and 15 even-numbered days. Dave ran 16 times for 15 min. and 15 times for 44 min. That's a total of $(15 \times 16) + (15 \times 44) = 15 \times (16 + 44)$ min. = 15 hours. A) 15 B) 30 C) 60 D) 900	24. A
25. $5 \times \sqrt{5} \times 5 \times \sqrt{5} = 5 \times 5 \times \sqrt{5} \times \sqrt{5} = 5 \times 5 \times 5$. A) $5 \times 5 \times 25$ B) $5 \times 5 \times 5$ C) $5 \times 5 \times 2$ D) 5×5	25. B
26. The product of two whole numbers is 30. If the numbers are 5 and 6, their sum is $5 + 6 = 11$. A) 10 B) 11 C) 13 D) 31	26. B
27. $222 \times 66 = (2 \times 111) \times (2 \times 3 \times 11) = (3 \times 111) \times (2 \times 2 \times 11) = 333 \times 44$. A) 1 B) 2 C) 3 D) 4	27. A

Go on to the next page ➡ 6

	Answers
1. A spider has 8 legs and a tortoise has 4 legs. How many legs do 3 spiders and 3 tortoises have all together? A) 14 B) 17 C) 36 D) 42	1. C
2. ? is divisible by 3. A) 2009 B) 2010 C) 2011 D) 2012	2. B
3. $4 \times 4 \times 2 \times 2 \times 4 \times 0 =$ A) 6400 B) 64 C) 12 D) 0	3. D
4. A square has a side of length 5. What is its perimeter? A) 10 B) 20 C) 25 D) 50	4. B
5. $13 + (15 + 17) =$ A) $(13 + 15) + 17$ B) $(13 + 15) + (13 + 17)$ C) $(13 \times 15) + (13 \times 17)$ D) $13 \times (15 + 17)$	5. A
6. A Ferris wheel costs 50¢ per ride and a roller coaster costs \$1.25 per ride. The total cost of 5 Ferris wheel rides and 10 roller coaster rides is A) \$13 B) \$14 C) \$15 D) \$16	6. C
7. $\frac{1}{8} + \frac{2}{8} + \frac{3}{8} =$ A) $\frac{3}{4}$ B) $\frac{3}{8}$ C) $\frac{3}{16}$ D) $\frac{5}{24}$	7. A
8. Yesterday the train came at 8 AM, and today it came at 3 PM. How many hours passed between yesterday's and today's arrivals? A) 7 B) 19 C) 31 D) 35	8. C
9. $2008 + 2009 + 2010 + 2011 + 2012 =$ A) 10050 B) 10051 C) 10052 D) 10053	9. A
10. How many prime factors does 42 have? A) 1 B) 2 C) 3 D) 4	10. C
11. Half the sum of the degree-measures of the angles of an isosceles triangle is A) 45 B) 90 C) 180 D) 360	11. B
12. Which of the following numbers is *not* the square of a whole number? A) 100 B) 144 C) 196 D) 200	12. D
13. The greatest common factor of 23 and 24 is A) 20 B) 12 C) 2 D) 1	13. D
14. $6 \times 6 \times 6 \times 6 \times 6 =$ A) 6×5 B) 5^6 C) 6^5 D) 4^6	14. C

	Answers
15. Amy's age is three times the age of her little sister Bo. Her Uncle Charles' age is three times the sum of the ages of Amy and Bo. If Amy is 18, how old is Charles? A) 54 B) 60 C) 66 D) 72	15. D
16. 5 = 10% of 20% of A) 1000 B) 530 C) 500 D) 250	16. D
17. How many even numbers are there between 2011 and 2099? A) 44 B) 45 C) 88 D) 89	17. A
18. What is the average of 80, 83, 86, 89, and 92? A) 85 B) 85.5 C) 86 D) 86.5	18. C
19. In a class of 18 students, 6 are wearing jeans. What is the ratio of students wearing jeans to students *not* wearing jeans? A) 1:2 B) 1:3 C) 2:3 D) 2:1	19. A
20. The sum of two numbers is 12, and their product is 35. The larger of the two numbers is A) 8 B) 7 C) 6 D) 5	20. B
21. $(123 \times 8) + (123 \times 9) + (123 \times 10) + (123 \times 11)$ is divisible by A) 9 B) 8 C) 7 D) 6	21. D
22. When twice the perimeter of a square is tripled, the result is 72. What is the area of the square? A) 3 B) 9 C) 12 D) 16	22. B
23. Of the following numbers, which is the largest number? A) 1^5 B) 2^4 C) 3^3 D) 4^2	23. C
24. On every odd-numbered day in May, Dave ran for 15 minutes. On every even-numbered day in May, he ran for 44 minutes. For how many *hours* did he run in May? A) 15 B) 30 C) 60 D) 900	24. A
25. $5 \times \sqrt{5} \times 5 \times \sqrt{5} =$ A) $5 \times 5 \times 25$ B) $5 \times 5 \times 5$ C) $5 \times 5 \times 2$ D) 5×5	25. B
26. The product of two whole numbers is 30. What is the least possible value of their sum? A) 10 B) 11 C) 13 D) 31	26. B
27. $222 \times 66 = 333 \times 44 \times$? A) 1 B) 2 C) 3 D) 4	27. A



	Answers
28. $(8+10+12)+(8+10-12)+(8+12-10)+(10+12-8)=$ A) $(8+10+12)$ B) $2\times(8+10+12)$ C) $3\times(8+10+12)$ D) $4\times(8+10+12)$	28. **B**
29. If a whole number between 100 and 999 has three different non-zero digits, what is the least possible value of the sum of its digits? A) 7 B) 6 C) 4 D) 3	29. **B**
30. In 20 years, Ed will be 31 and Di will be 35. The sum of their ages now is A) 26 B) 46 C) 86 D) 106	30. **A**
31. What month is 1000 months after March? A) March B) May C) June D) July	31. **D**
32. The ones digit of the product $123\times456\times789$ is A) 1 B) 2 C) 3 D) 4	32. **B**
33. An equal number of pennies, nickels, and dimes have a combined total value of \$2.40. The total value of the nickels is A) 15¢ B) 50¢ C) 75¢ D) 95¢	33. **C**
34. $(2010-2005)\times(2005-2000)\times(2000-1995)\times\ldots\times(10-5)\times(5-0)=$ A) 5^{402} B) 5^{401} C) 5×402 D) 5×401	34. **A**
35. Two equilateral triangles share sides with a square, as shown. If a side of the square has a length of 4, what is the perimeter of the figure? A) 48 B) 40 C) 32 D) 24	35. **D**
36. If there are 420 students in my school, then the ratio of boys to girls in my school *cannot* be A) 3:7 B) 5:9 C) 11:14 D) 17:18	36. **C**
37. 300% of 300 = _?_% of 3000 A) 10 B) 25 C) 30 D) 50	37. **C**
38. Bricks weigh 3 kg or 7 kg each. Cy picks up at least one brick of each size. The total weight of bricks he picks up *cannot* be A) 21 kg B) 27 kg C) 30 kg D) 39 kg	38. **A**
39. The smallest prime number that is a factor of $(1\times2\times3\times\ldots\times30)+1$ must be A) less than 10 B) between 10 & 20 C) between 20 & 30 D) greater than 30	39. **D**
40. How many whole numbers from 1 through 500 have a 3 as the hundreds digit or ones digit, but *not* as both? A) 130 B) 140 C) 150 D) 160	40. **A**