"Math Is Cool" Championships-1997-8

Sponsored By Steven E. Gregg DDS

November 21, 1997

Individual Contest, Grade 7

Express all answers as reduced fractions unless stated otherwise.
Leave answers in terms of π where applicable.
Do not round any answers unless stated otherwise.

1. Evaluate: $(4 \times 6^2 - 150)^2$
2. Simplify: $\dfrac{x^2+5x+4}{x^2+3x-4}$
3. Find all integer values of x that make the following statement true: $160 < x^2 < 190$
4. Jina is three times older than Tim. It can also be said that Jina is 14 years older than Tim. How old is Jina?
5. Find the number of sides of a regular polygon with perimeter 84 and side length 6.
6. What is the area of a circle with diameter 14?
7. What is the smallest number greater than 10,000 with 5 distinct digits?
8. If the bell rings every 7 minutes, the siren goes off every 8 minutes, the dog barks every 6 minutes, and they all go off at 11:00a.m., when will they next go off together?
9. The sum of two numbers is 57, and the difference is 9. What is the greater of the two numbers?

10. In the pattern AlGEBRAALGEBRAALGEBRA..., what is the 400^{th} letter?

11. Evaluate: $10^4-10^3-10^2+10$.

12. What is the side length of a cube with surface area 54?

13. What is the probability of drawing a diamond from a standard deck of 52 cards that is missing all of the clubs and the seven of diamonds?

14. If the space shuttle orbits the earth once every 5 hours, 5 minutes, and 5 seconds, then how many complete orbits will it make in 5 days?

15. Forrest Gump ran 102 miles. Half the time he spent running 50mph and the other half of the time he ran 25 mph. How far did he run at 50 mph.

16. If $A✌B = (A + 2B) + (A - B)$,
What is $\frac{20}{3} ✌ \frac{2}{3}$

17. Into what regular polygon should you bend a piece of wire so that it will hold the minimum area?

18. I wrote a 3 digit number where all the digits were prime. How many different numbers could I have written?

19. It is presently 4:19:23 P.M. If my watch stopped running 333 hours, 29 min, and 17 seconds ago, what time does my watch read?

20. Write twenty-three million, forty thousand, two hundred five and seventy-eight hundredths as a decimal.

21. What is the probability of rolling a sum of five with two six-sided dice?

22. Write the following expression as a decimal: $\frac{1}{10}+\frac{1}{20}+\frac{3}{1000}+\frac{1}{2500}$

23. Theta went to the ice cream shop and noticed that there were four different cones, three different ice creams, and seven different toppings. How many different ice cream cones could he buy?

24. Solve for x: $\frac{1}{3x}=\frac{101}{103}\times\frac{99}{101}\times\frac{97}{99}\times\ldots\times\frac{5}{7}\times\frac{3}{5}$

25. True or false: The sum of two prime numbers is always even.

26. State the next term in the sequence: ab^3, ab, $\frac{a}{b}$, $\frac{a}{b^3}$, ____

27. If a coin is flipped 5 times, what is the probability that heads will turn up exactly once?

28. What is 20% of 20?

29. What is the sum of the digits in the number (10^6-4)?

30. For how many different integer values of x is $\frac{4}{x}$ an integer?

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November 21, 1997 7th Grade

Individual Multiple Choice Contest

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1. There are 30 students in a math class. Of the following, which could be a ratio of boys to girls?

A)2:3 B) 3:5 C) 2:6 D) 3:4 E) B and A F) B and C G) Answer not given

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2. $2^{1000} + 2^{1000} =$

A)2^{1001} B) 2^{2000} C)4^{1001} D) 4^{2000} E) Answer not given

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3. If 22 of five dozen donuts have chocolate frosting, 13 have cream filling, and 7 have both, how many have neither chocolate frosting nor cream filling?

A)25 B) 32 C)18 D) 11 E) answer not given

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4. If the math team has 12 people, how many possible outcomes are there for a president and a vice president?

A)132 B)33 C)66 D) answer not given E) infinite

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5. Silas has 96 equations, graphs, data plots, programs, and functions on his calculator. If 1/8 of them are data plots, 1/3 are graphs, and 8 are equations, how many are programs?

A) 52 B) 44 C) 48 D) 46 E) Not enough information given

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6. The complement of an acute angle is always ____?___ angle?

A) an acute B) a right C) an obtuse D) a straight E) answer not given

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7. What is the greatest common factor of 2^5 and 2^6?

A) 2 B) 2^5 C) 2^6 D) 2^{11} E) answer not given

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8. A can of paint can paint a wall 3 feet by 5 feet. How many cans of paint are needed to paint a wall 9 feet by 15 feet?

A) 9 B) 3 C) 180 D) 8 E) answer not given

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9. How many 20's must I add together to get a sum equal to 20^3?

A) 20 B) 400 C) 40 D) 3 E) answer not given

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November 21, 1997 7th Grade

Team Contest

Express all answers as reduced fractions in terms of radicals.

1. If the legs of a isosceles right triangle are radii of a circle whose area is 64π, what is the area of the triangle?

2. What is the sum of the reciprocals of the factors of 6?

3. A 20 foot string is cut into two pieces whose lengths are in ratio of 2:3. What is the length of the longer pieces in feet?

4. $\frac{21}{2}$ is how much more than $\frac{2}{21}$?

5. What is the probability that a two digit number selected at random will have its tens digit less than its units digit?

6. It is Friday, the time is 5:07 p.m.. What day of the week will it be in 8563112 seconds?

7. What is the remainder when 10^{99} is divided by 9?

8. Twin primes are prime numbers whose difference is 2. Example 11 and 13 are twin primes. Is the product twin primes always odd, even, or can not be decided?

9. If Silas starts counting by threes starting at 3 and Drew counts backwards from 998 by twos at the same rate, what number will they say together?

10. Evaluate: $\sqrt{\sqrt{\sqrt{\sqrt{2^{32}}}}}$

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Pressure Round Contest, 7th Grade

November 21 , 1997

1. Evaluate: 47-(-2-3(-23-(-21)))

2. If two dogs weigh as much as three cats, and two cats weigh as much as 15 mice, how many dogs weigh as much as 45 mice?

3. If 250 is divided by 17, then what is the product of the quotient and remainder.

4. The sum of three consecutive integers is 66, then what is the largest of the three integers?

5. What number when added to 5555 results in a sum of 6000?

"Math Is Cool" Championships-1997-8

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November 21, 1997

Mental Math, Grade 7

Express all answers as reduced fractions in terms of radicals and π, where applicable, unless otherwise instructed.

Person #1

1. What is the product of 12 and 13?
2. The product of two numbers is 42, while their sum is 13. What is the smaller number?
3. What is the sum of 3/4 and 2/3?
4. What is 10% of 230?

Person #2

1. If today is Friday, what day of the week is it 20 days after today?
2. Evaluate: 3^4
3. List the prime factors of 96.
4. If four people have an average of 37 cents each, how many cents do they have together?

Person#3

1. I have 20 identical coins whose sum is one dollar, what type of coin do I have?
2. What is 25% of 204?
3. How many odd numbers are between 30 and 70?
4. What is the volume of a cube with side length 3?

Person#4

1. What is the one-fifth the sum of 27 and 68?
2. What is the product of the number of days in a week and the number of months in a year?
3. What is the sum of the interior angles of a square?
4. How many sides does a decagon have?

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November 21, 1997 7th Grade

College Knowledge Bowl Questions #1

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1. What is the volume of a rectangular box with length 7, height 11 and width 3?

Answer: 231

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2. What is the probability of drawing a red seven or a club from a standard deck of 52 cards?

Answer: 15/52

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3. What is the measure of an angle supplementary to an angle with a measure of 123 degrees?

Answer: 57°

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4. The sum of three consecutive odd integers is 51. What is the smallest of the three integers?

Answer:15

---

5. If two angles in a triangle measure 23.5° and 32.3°, what is the measure of the third angle?

Answer:124.2°

---

6. How many two digit numbers contain at least one two and at least one seven?

Answer: 2

---

7. Which is an example of valid reasoning;

a) All Martians are green. Tom is green. Therefore Tom is a Martian.
b) All Martians are green. Tom is a Martian. Therefore Tom is green.
c) All Martians are green. George is not a Martian. Therefore George is not green
d) All Martians are green. George is not a Martian. Therefore George is blue.

Answer: (b) or the second one

Extra Question: Greg rode his bike at 5 meters per second for 1 hour. How many kilometers did he travel?

Answer: 18

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November 21, 1997 7th Grade

College Knowledge Bowl Questions #2

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1. What is the sum of the non prime factors of 81?

Answer: 118

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2. What is the volume of a pyramid with base area 12 and height 5?

Answer: 20

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3. What is the mean of the following data set: {3, 11, 15, 19}

Answer: 12

---

4. How many different ways can you arrange the letters in "SILAS". (Assume that all the letters are capital)

Answer: 60

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5. The product of six whole numbers is 40. What is the largest possible sum of these six numbers?

Answer:45

---

6. What is the smallest whole number which I can multiply by 11 and still get a product whose value is more than 300?

Answer: 28

---

7. What is the digit in the hundreds place of the product: 95x90x85x80x....x10x5.

Answer: 0

Extra Question: The area of a circle is 16π. What is the diameter of the circle?

Answer: 8

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November 21, 1997 7th Grade
College Knowledge Bowl Questions #3

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1. What is the area of a triangle with sides 6, 8, and 10 units?

Answer:24

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2. Find the median of the data set { 4, 7, 3, 9, 11, 2, 7}

Answer: 7

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3. Find the units digit in 6^{1997}.

Answer: 6

---

4. What is 31 in base 2?

Answer: 11111

---

5. What is the sum of the prime factors of 98?

Answer: 16

---

6. When an odd number is subtracted from the product of an odd number and an even number, is the result always even, always odd, or sometimes both?

Answer: always odd

---

7. What is the product of all integer multiples of 4?

Answer: 0

Extra Question: If all sides of a triangle are whole numbers and the perimeter is 7, what is the length of the longest side?

Answer: 3

"Math Is Cool" Championships -- 1997-8

November 21, 1997 7th Grade

Individual Contest - Score Sheet

Score: KEY

Full Name:_____ School:_____

DO NOT WRITE IN SHADED REGIONS

	Answer		
1.	36		
2.	(X+1)/(x-1)		
3.	±13		
4.	21		
5.	14		
6.	49π		
7.	10234		
8.	1:48p.m.		
9.	33		
10.	A		
11.	8910		
12.	3		
13.	6/19		
14.	23		
15.	68		

	Answer		
16.	14		
17.	A Triangle		
18.	64		
19.	6:50:06 A.M.		
20.	23,040,205.78		
21.	1/9		
22.	.1534		
23.	84		
24.	103/9 or 11 4/9		
25.	False		
26.	a/b^5		
27.	5/32		
28.	4		
29.	51		
30.	6		

"Math Is Cool" Championships -- 1997-8

November 21, 1997 7th Grade

Individual Multiple Choice Contest - Score Sheet

Score:
KEY

School:_____ Team #:_____

DO NOT WRITE IN SHADED REGIONS

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

	Answer		
1.	A		
2.	A		
3.	B		
4.	A		
5.	E		
6.	A		
7.	B		
8.	A		
9.	B		

"Math Is Cool" Championships -- 1997-8

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Team Contest - Score Sheet

Score:

KEY

School:_____ Team #:_____

DO NOT WRITE IN SHADED REGIONS

	Answer		
1.	32		
2.	2		
3.	12		
4.	437/42		
5.	2/5		
6.	Saturday		
7.	1		
8.	odd		
9.	600		
10.	4		

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November 21, 1997 7th Grade

Pressure Round - Score Sheet

	Answer		
1.	43		
2.	4		
3.	168		
4.	23		
5.	445		

"Math Is Cool" Championships -- 1997-8

November 21, 1997 7th Grade

Mental Math - Score Sheet

School:_____ Team #:_____

A. 1. 156

2. 6

3. 17/12 OR 1 5/12

4. 23

B. 1. Thursday

2. 81

3. 2,3 (Order doesn't matter)

4. 148

C. 1. nickel or 5 cent piece

2. 51

3. 20

4. 27

D. 1. 19

2. 84

3. 360

4. 10