

WCTM MATHEMATICS CONTEST, 2004

Test 1

Name: _____

CLASS 7 & 8 Grade

SCHOOL: _____

SCORING: 20 points for each correct answer, -5 for each wrong answer.

1. If $2x + 1 = 2$, then $4x + 1 =$
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5 [1] _____

2. The expression $\frac{2x - 7}{x - 4} + \frac{1}{4 - x}$ is equal to
 (A) $\frac{2x - 6}{x - 4}$ (B) $\frac{2x - 6}{4 - x}$ (C) $\frac{2x + 8}{x - 4}$ (D) 2 (E) 1 [2] _____

3. A stereo system is on sale at 25% off the list price of \$325. The sale price is
 (A) \$81.25 (B) \$300 (C) \$243.75 (D) \$75 (E) none of these [3] _____

4. How many pairs (x, y) of non-negative integers can be the solutions of $x + y = 2$?
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 6 [4] _____

5. If 0.02% of the population statistically gets a rare type of flu, then how many people in 50,000 catch this flu?
 (A) 1000 (B) 100 (C) 10 (D) 1 (E) none of these [5] _____

6. The slope of the straight line $x - 2y = -1$ is
 (A) 2 (B) $\frac{1}{2}$ (C) $-\frac{1}{2}$ (D) -2 (E) none of these [6] _____

7. In a right triangle, if the lengths of two edges are 2 and 5, the length of the third edge is
 (A) $\sqrt{29}$ (B) $\sqrt{21}$ (C) 29 (D) 21 (E) need more info to determine [7] _____

8. Which number in $\{3, -1, 5, -4, 2, 6\}$ is closest to 0?
 (A) 3 (B) 2 (C) -4 (D) 5 (E) -1 [8] _____

9. If $A * B = A(B - 1)$ then $3 * 7 =$
 (A) 21 (B) 18 (C) 12 (D) 20 (E) none of these [9] _____

10. Suppose $x^2 + \frac{1}{x^2} = 79$, then

(A) $x = \frac{9}{2}$

(B) $x + \frac{1}{x} = 9$

(C) x is an integer

(D) x cannot be a rational number

(E) none of these

[10] _____

WCTM MATHEMATICS CONTEST, 2004

Test 2

NAME: _____

CLASS 7th & 8th Grade

SCHOOL: _____

SCORING: 20 points for each correct answer, -5 for each wrong answer.

1. $(-1)^1 + (-1)^2 + (-1)^3 + \dots + (-1)^{999} =$
 (A) 0 (B) 1 (C) -1 (D) 2 (E) -999 [1] _____

2. How far would a car travel in 80 minutes at speed 75 MPH?
 (A) 60 miles (B) 100 miles (C) 112.5 miles (D) 90 miles (E) 97.5 miles [2] _____

3. The surface area of a cube whose side is 4cm is
 (A) 12 cm^2 (B) 256 cm^2 (C) 96 cm^2 (D) 128 cm^2 (E) 64 cm^2 [3] _____

4. Light travels at a speed of 186,000 miles each second. There are 5280 feet in one mile. One nanosecond is one-billionth of one second. How many feet will light travel in one nanosecond (to nearest whole number)?
 (A) 1 (B) 98 (C) 985 (D) 35227 (E) none of these [4] _____

5. Find the next term in the sequence: 2, 5, 10, 17, 26,
 (A) 60 (B) 39 (C) 47 (D) 37 (E) 20 [5] _____

6. A student has an average score of 72 after three tests. This student had an average score of 78 after the first two tests. What was the student's score on the third test?
 (A) 75 (B) 60 (C) 66 (D) 62 (E) none of these [6] _____

7. Steve's savings account yields 1% simple annual interest. In two years, the balance of his account becomes \$10,201. How much must he have deposited?
 (A) \$10,000 (B) \$10,100 (C) \$9,901 (D) \$8,034
 (E) none of these [7] _____

S	M	T	W	T	F	S
			2			
					o	
	o					

8. The dates where the circles are in the calendar are
 (A) 16 and 19 (B) 9 and 11 (C) 18 and 21 (D) 9 and 12 (E) none of these [8] _____

9. If $x^3 = -2$, then

- (A) $x^2 = \sqrt{2}$ (B) $x^6 = -4$ (C) $x = -1$ (D) $x^4 = 4$ (E) $x^9 = -8$ [9] _____

10. If x is a multiple of 12 and x is also a multiple of 28, then the smallest possible value of x is:

- (A) greater than 100 (B) 128 (C) less than 56 (D) between 80 and 100 (E) none of these [10] _____

WCTM MATHEMATICS CONTEST, 2004

Test 3

NAME: _____

CLASS 7th & 8th Grade

SCHOOL: _____

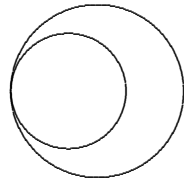
SCORING: 20 points for each correct answer, -5 for each wrong answer.

1. $\left(\frac{-2}{13}\right)\left(\frac{-1}{4}\right) - (-1) =$
 (A) $\frac{25}{26}$ (B) $\frac{27}{26}$ (C) $-\frac{25}{26}$ (D) $-\frac{27}{26}$ (E) none of these [1] _____

2. A man bought a horse for \$60, sold it for \$70, then bought it back for \$80 and finally sold it for \$90. How much money did he make or lose in the transactions?
 (A) lost \$30 (B) made \$40 (C) broke even (D) made \$20 (E) none of these [2] _____

3. Which number is irrational?
 (A) $\frac{3}{5}$ (B) the root of $x^2 - 4 = 0$ (C) π^2 (D) $\frac{\sqrt{8}}{\sqrt{2}}$ (E) none of these [3] _____

4. In the figure, the diameter of the outer circle is 3, the diameter of the inner circle is 2. The area between the inner and outer circles is



(A) $\frac{5}{4}$ (B) $\frac{\pi}{2}$ (C) 5π (D) π (E) $\frac{5\pi}{4}$ [4] _____

5. How many prime numbers are in {21, 341, 29, 81, 93}?
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 4 [5] _____

6. Which statement is true?
 (A) $\frac{3}{7} < 15\%$ (B) $\frac{1}{7} = 16\%$ (C) $3\frac{2}{9} < 3.2$ (D) $80\% = \frac{28}{35}$ (E) none of these [6] _____

7. If the scale of a road map is 1/2 inch = 550 miles, how many inches would represent 3400 miles?
 (A) 3 (B) $\frac{68}{11}$ (C) 3.1 (D) $\frac{68}{22}$ (E) $\frac{11}{34}$ [7] _____

8. John left his math class at 3:15pm. His school is 20 minutes walk from his house. His class lasted 50 minutes. What time did he get home if he went straight home?

- (A) 4:25pm (B) 4:05pm (C) 3:35pm (D) 3:45pm (E) 4:45pm [8] _____

9. The intersection of the straight lines $y = 2x - 1$ and $3x + y = 3$ is

- (A) $(4, 3)$ (B) $(\frac{3}{5}, \frac{4}{5})$ (C) $(\frac{4}{5}, \frac{3}{5})$ (D) $(-\frac{4}{5}, -\frac{3}{5})$ (E) $(-\frac{3}{5}, \frac{4}{5})$ [9] _____

10. If a die is rolled 24 times, how many times is the number 3 expected to come up?

- (A) 4 (B) 3 (C) 5 (D) 6 (E) 12 [10] _____

WCTM MATHEMATICS CONTEST, 2004

Test 4

NAME: _____

CLASS 7th & 8th Grade

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SCORING: 20 points for each correct answer, -5 for each wrong answer.

1. what is the value of $\frac{10}{6^{-3}27^{1/3}}$?

- (A) 360 (B) 180 (C) 720 (D) 630 (E) 540 [1] _____

2. If the geometric mean of positive numbers a and b is \sqrt{ab} , then the geometric mean of 18 and 2 is

- (A) 10 (B) 6 (C) 16 (D) $4\sqrt{2}$ (E) ± 6 [2] _____

3. The value of $m^2 - n^3 + 1$ when $m = 3$ and $n = -2$ is

- (A) 2 (B) 17 (C) 18 (D) 14 (E) 6 [3] _____

4. The greatest common factor of 75 and 120 is:

- (A) 3 (B) 5 (C) 15 (D) 20 (E) 25 [4] _____

5. How many integers between 91 and 243 are multiples of 8?

- (A) 18 (B) 17 (C) 20 (D) 21 (E) 19 [5] _____

6. All Wyoming phones have area code 307. How many different phone numbers are possible with this area code?

- (A) 10^4 (B) 10^7 (C) 10^{10} (D) $10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4$ (E) $10 \cdot 9 \cdot 8 \cdot 7$ [6] _____

7. Simplify $[6(5 - 1) + 19] - [14 - (9 + 2)]$:

- (A) 40 (B) 23 (C) 18 (D) 36 (E) none of these [7] _____

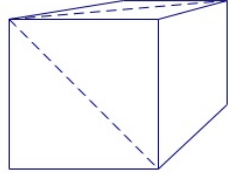
8. If $\frac{1}{2} + \frac{1}{3} + \frac{a}{6} = \frac{3}{4}$, then $a =$

- (A) 1 (B) -1 (C) $-\frac{1}{2}$ (D) 2 (E) $\frac{1}{2}$ [8] _____

9. A number n can be written in base 2 as $n = 110110_2$ which means $n = 1 \cdot 2^5 + 1 \cdot 2^4 + 0 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 0 = 32 + 16 + 4 + 2 = 54$. In base 5, n can be written as:

- (A) 54_5 (B) 104_5 (C) 204_5 (D) 102_5 (E) none of these [9] _____

10. What is the angle between the two dotted lines shown on the cube measured in degree? Note that one dotted line is on the top face and the other is on the front face.



- (A) 45 (B) 90 (C) 60 (D) 30 (E) none of these [10] _____

WCTM MATHEMATICS CONTEST, 2004

Test 5

NAME: _____

CLASS 7th & 8th Grade

SCHOOL: _____

SCORING: 20 points for each correct answer, -5 for each wrong answer.

1. If n is an odd integer, which of the following is an even number?

- (A) n^2 (B) $\frac{n}{2}$ (C) $n(n+1)$ (D) $\sqrt{n} + 2$ (E) $2n + 5$ [1] _____

2. If x is between 12 and 18 inclusive and y is between 3 and 8 inclusive, then $x - y$ is

- (A) between 4 and 15 inclusive (B) between 9 and 15 inclusive (C) between 4 and 10 inclusive
(D) between 9 and 10 inclusive (E) none of these [2] _____

3. After the price of a product has been reduced by 20%, by what percentage must the price be raised so that the product has its original price?

- (A) 18% (B) 20% (C) 25% (D) 30% (E) none of these [3] _____

4. When Joe was 11 years old, he asked his uncle: "How old are you?". His uncle answered: "I will be 79 when you are my age". How old was his uncle when Joe was 11 years old?

- (A) 34 (B) 45 (C) 35 (D) 44 (E) none of these [4] _____

5. If the average of three numbers is 12, and if one of the numbers is 6, then what is the average of the other two numbers?

- (A) 10 (B) 20 (C) 30 (D) 15 (E) none of these [5] _____

6. If $\log_a 27 = 3$, then

- (A) $e^3 = 27$ (B) $a^2 = 27$ (C) $a = 81$ (D) $a^2 = 9$ (E) none of these [6] _____

7. Katie received the following scores in a math contest: 9.6, 8.9, 7.5, 8.0, 8.5. What is her mean score?

- (A) 8.9 (B) 8.5 (C) 7.5 (D) 8.0 (E) 8.4 [7] _____

8. How many edges does a cube have?

- (A) 6 (B) 8 (C) 4 (D) 12 (E) 16 [8] _____

Grades JHS
2004 Math Contest Exam

Questions	Test 1	Test 2	Test 3	Test 4	Test 5
1	C	C	B	C	C
2	D	B	D	B	A
3	C	C	C	C	C
4	D	A	E	C	B
5	C	D	B	E	D
6	B	B	D	B	D
7	E	A	D	A	B
8	E	C	C	C	D
9	B	E	C	C	E
10	D	D	A	C	A