

WCTM MATHEMATICS CONTEST, 2003

Test 1

NAME: \_\_\_\_\_

CLASS 7 & 8 Grade

SCHOOL: \_\_\_\_\_

1. Ann sent a gift to Bob by UPS. The total cost was \$27.31. The shipping cost is \$7.35 and sales tax is \$1.14. The gift alone costs:

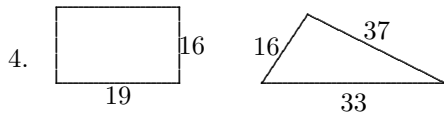
- (A) \$19.96    (B) \$26.17    (C) \$34.65    (D) \$18.82    (E) The tax rate is needed before an answer can be calculated. [1] \_\_\_\_\_

2. John finds balloons on sale at \$1.80 per dozen. He can purchase 80 for

- (A) \$12.60    (B) \$12.00    (C) \$10.80    (D) \$14.40    (E) none of these [2] \_\_\_\_\_

3. Mr. McCoy has 305 jelly beans. He gives 14 to each student in his class and has 11 left over. How many students does he have in his class?

- (A) 19    (B) 20    (C) 21    (D) 23    (E) 24 [3] \_\_\_\_\_

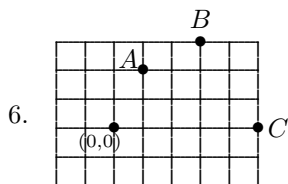


The area of the rectangle is greater than the area of the triangle. However, the perimeter of the triangle is how much bigger than the perimeter of the rectangle?

- (A) 51    (B) 20    (C) 31    (D) 16    (E) none of these [4] \_\_\_\_\_

5. A triangle has 0 diagonals. A square has 2 diagonals. A pentagon has 5 diagonals. A polygon with 20 diagonals has how many sides?

- (A) 8    (B) 6    (C) 7    (D) 9    (E) there is no such polygon [5] \_\_\_\_\_



Assuming the distance between adjacent grid lines is one unit, find the sum of the coordinates of *B* is:

- (A) 9    (B) 8    (C) 3    (D) 5    (E) 6 [6] \_\_\_\_\_

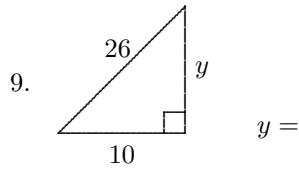
17	3	13
7	11	15
9	$a$	$b$

7. The missing numbers in this magic square add up to:

- (A) 33                      (B) 24                      (C) 27                      (D) 19                      (E) 12                      [7] \_\_\_\_\_

8.  $(23 \div 6) \div \left(\frac{1}{6}\right) =$

- (A)  $\frac{23}{36}$                       (B) 138                      (C)  $\frac{23}{12}$                       (D) 23                      (E) none of these                      [8] \_\_\_\_\_



- (A) 20                      (B) 24                      (C) 16                      (D) 18                      (E) 23                      [9] \_\_\_\_\_

10. There are how many odd composite numbers less than 20?

- (A) 12                      (B) 10                      (C) 5                      (D) 3                      (E) none of these                      [10] \_\_\_\_\_

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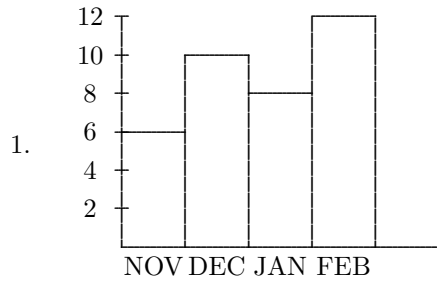
Test 2

NAME: \_\_\_\_\_

CLASS 7th & 8th Grade

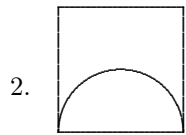
SCHOOL: \_\_\_\_\_

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



At West Yellowstone records of snowfall were kept on a bar graph. The average for the four months is:

- (A) 36''      (B) 9''      (C) 18''      (D) 8''      (E) 10''      [1] \_\_\_\_\_

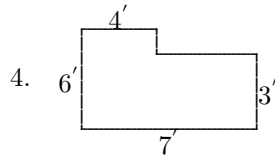


The perimeter of the square is 88. The difference between the area of the square and the semi-circle is:

- (A)  $121\pi - 121$       (B)  $484\pi - 484$       (C)  $121\pi + 121$       (D)  $484 - 121\pi$       (E) none of these      [2] \_\_\_\_\_

3. 180 has how many odd divisors?

- (A) 6      (B) 4      (C) 9      (D) 18      (E) 12      [3] \_\_\_\_\_



The area of this region is:

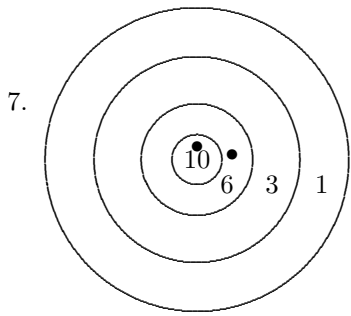
- (A) 42 sq. ft.      (B) 21 sq. ft.      (C) 24 sq. ft.      (D) 33 sq. ft.      (E) none of these      [4] \_\_\_\_\_

5.  $7 + 8.8 + 3\frac{3}{4} + 4.45 =$

- (A) 23.05      (B) 24.25      (C) 23.75      (D) 24      (E) 25      [5] \_\_\_\_\_

6. Bananas are priced at 50 cents each or three for \$1.25. Curious George wants to buy as many as possible for his friends. He has \$7.75. How many bananas can he buy?

- (A) 19      (B) 18      (C) 17      (D) 16      (E) 15      [6] \_\_\_\_\_



You have two more arrows to shoot. Assuming you always hit the target, your score *cannot* be

- (A) 29      (B) 30      (C) 23      (D) 25      (E) 18      [7] \_\_\_\_\_

8. 3 yards minus  $8\frac{1}{3}$  ft. is

- (A) 12 inches      (B) 11 inches      (C) 10 inches      (D) 9 inches      (E) 8 inches      [8] \_\_\_\_\_

9. The sum of the composite numbers in the set  $\{1, 2, 3, 4, 5, 8, 15\}$  is

- (A) 28      (B) 27      (C) 5      (D) 6      (E) none of these      [9] \_\_\_\_\_

10. Pick a number greater than 20. Subtract 15. Triple the result and add 93. Divide by 3. Subtract the original number. The result is always

- (A) the original number      (B) 1      (C) 16      (D) 10      (E) the original number+1      [10] \_\_\_\_\_

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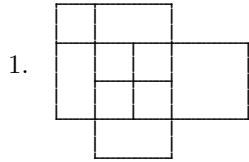
Test 3

NAME: \_\_\_\_\_

CLASS 7th & 8th Grade

SCHOOL: \_\_\_\_\_

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



How many squares are shown in this diagram?

- (A) 5                      (B) 8                      (C) 9                      (D) 10                      (E) 11                      [1] \_\_\_\_\_

2. If  $\sin x = \frac{1}{3}$ , then  $\cos\left(x + \frac{\pi}{2}\right) =$

- (A)  $\sqrt{1 - \frac{1}{9}}$                       (B)  $\frac{1}{3}$                       (C)  $-\frac{1}{3}$                       (D)  $\frac{2}{3}$                       (E)  $-\frac{2}{3}$                       [2] \_\_\_\_\_

3. Tina is 5 years older than her sister. Last year she was twice as old as her sister. Tina's age now is

- (A) 8                      (B) 6                      (C) 10                      (D) 11                      (E) 12                      [3] \_\_\_\_\_

4. What number is next in the pattern 9, 13.25, 17.5, 21.75, ...

- (A) 25                      (B) 25.25                      (C) 24.75                      (D) 25.5                      (E) none of these                      [4] \_\_\_\_\_

5. What is  $x$ ?

$n$	1	2	$x$	10	0
$(5+n)2$	12	14	32	30	10

- (A) 16                      (B) 5                      (C) 6                      (D) 12                      (E) 11                      [5] \_\_\_\_\_

6. There are how many prime numbers less than 20?

- (A) 4                      (B) 5                      (C) 6                      (D) 7                      (E) none of these                      [6] \_\_\_\_\_

7.  $2\frac{4}{20} + 3\frac{1}{3} + 4\frac{1}{2} + 5\frac{4}{5} + 7\frac{1}{6} =$

- (A)  $23\frac{1}{3}$                       (B)  $23\frac{9}{15}$                       (C)  $22\frac{27}{30}$                       (D) 23                      (E)  $22\frac{19}{30}$                       [7] \_\_\_\_\_



WCTM MATHEMATICS CONTEST, 2003

Test 4

NAME: \_\_\_\_\_

CLASS 7th & 8th Grade

SCHOOL: \_\_\_\_\_

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

1. A pizza is divided into 10 equal slices. All but three are eaten. What percent of the pizza is left?

- (A) 10%                      (B) 70%                      (C) 3%                      (D) 30%                      (E) 7%                      [1] \_\_\_\_\_

2. Fred weighs 86 lbs. He and his little sister have an average weight of 73 lbs. His sister weighs

- (A) 45 lbs.                      (B) 50 lbs.                      (C) 55 lbs.                      (D) 60 lbs.                      (E) 65 lbs.                      [2] \_\_\_\_\_

3.  $.6\bar{7} = .6777\dots =$

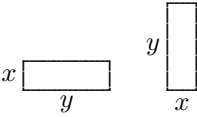
- (A)  $\frac{2}{3}$                       (B)  $\frac{2}{30}$                       (C)  $\frac{61}{90}$                       (D)  $\frac{60}{99}$                       (E)  $\frac{1}{33}$                       [3] \_\_\_\_\_

4. Two bags of oranges cost \$11.73. Oranges cost \$.69 cents per pound. The first bag weighs 10 pounds. How much did the second bag weigh?

- (A) 7 lbs.                      (B) 8 lbs.                      (C) 9 lbs.                      (D) 10 lbs.                      (E) 11 lbs.                      [4] \_\_\_\_\_

5.  $(-1)^{209} \times (-2)^4 =$

- (A) 16                      (B) -16                      (C) 8                      (D) -8                      (E) 225                      [5] \_\_\_\_\_

6.  The two rectangles are not considered to be different. How many different rectangles with perimeter 20, and whose sides are whole numbers, are there?

- (A) 10                      (B) 5                      (C) 4                      (D) 9                      (E) none of these                      [6] \_\_\_\_\_

7. A book has 150 pages. Jamal has read 92% of the book. How many pages does he have left to read?

- (A) 8                      (B) 138                      (C) 8                      (D) 12                      (E) 12                      [7] \_\_\_\_\_

8. The scores on a video game are 15,9,8,7,14,3,10,9,6. The number of scores above the average is

- (A) 5                      (B) 3                      (C) 4                      (D) 6                      (E) none of these                      [8] \_\_\_\_\_

9.  $24_6$  in base six means  $2 \times 6 + 4 = 16_{10}$  in base 10. What does  $135_6 =$

(A)  $123_{10}$

(B)  $71_{10}$

(C)  $59_{10}$

(D)  $46_{10}$

(E)  $99_{10}$

[9] \_\_\_\_\_

10. If  $x^2 + x - 30 = 0$  then  $x =$

(A) 5 or 6

(B) -5 or 6

(C) -5 or -6

(D) 5 or -6

(E) none of these

[10] \_\_\_\_\_

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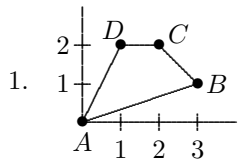
Test 5

NAME: \_\_\_\_\_

CLASS 7th & 8th Grade

SCHOOL: \_\_\_\_\_

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



The area of the quadrilateral  $ABCD$  is

- (A) 1                      (B) 2                      (C) 3                      (D) 4                      (E) none of these                      [1] \_\_\_\_\_

2. If  $x_1$  and  $x_2$  are the two roots of  $x^2 + ax + b = 0$ , then  $x_1x_2$  is

- (A)  $a$                       (B)  $-a$                       (C)  $b$                       (D)  $-b$                       (E) none of these                      [2] \_\_\_\_\_

3. If  $x = \frac{a}{a + \frac{1}{a}}$ ,  $a \neq 0$ , then  $x =$

- (A) 1                      (B)  $\frac{1}{1+a^2}$                       (C)  $1 - \frac{1}{1+a^2}$                       (D)  $a$                       (E)  $\frac{1}{1+a}$                       [3] \_\_\_\_\_

4. If  $x = a^2 - a + 1$ , then  $x$  is

- (A) always positive                      (B) always negative                      (C) negative if  $a$  is negative  
(D) always bigger than 1                      (E) zero for some  $a$

[4] \_\_\_\_\_

5. If the circumference of a circle is 1, then the area of the circle is

- (A)  $\frac{1}{4}$                       (B)  $\frac{1}{\pi}$                       (C)  $\frac{4}{11}$                       (D)  $\frac{1}{4\pi}$                       (E)  $\frac{\pi}{4}$                       [5] \_\_\_\_\_

6.  $\log_2 x + \log_4(2x + 1) =$

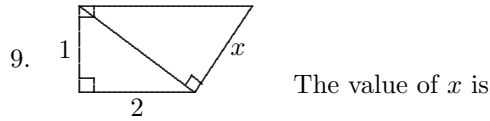
- (A)  $\log_2 \left( x + \frac{1}{2} \right)$                       (B)  $\log_2(x + 1)$                       (C)  $\ln(1 + x)$                       (D)  $\log_2(4x + 1)$                       (E)  $\log_4(x^2 + 2x^3)$                       [6] \_\_\_\_\_

7. The distance between the centers of the two circles  $x^2 + y^2 + 2x = 0$  and  $x^2 + y^2 + 2y = 0$  is

- (A) 1                      (B) 2                      (C)  $\sqrt{2}$                       (D)  $\frac{1}{2}$                       (E)  $\frac{1}{\sqrt{2}}$                       [7] \_\_\_\_\_

8. The diagonal of a rectangle is 1 and the perimeter of this rectangle is 2. The area of the rectangle is

- (A) 1                      (B)  $\sqrt{2}$                       (C) 2                      (D) no such rectangle                      (E) none of these                      [8] \_\_\_\_\_



- (A)  $\frac{5}{12}$                       (B)  $\sqrt{2}$                       (C)  $\sqrt{5}$                       (D)  $\frac{\sqrt{5}}{2}$                       (E)  $1 + \sqrt{2}$                       [9] \_\_\_\_\_

10.  $\frac{1}{\sqrt{x} - 1} =$

- (A)  $\sqrt{x} + 1$                       (B)  $\frac{1}{\sqrt{x}} - 1$                       (C)  $\sqrt{x} - 1$                       (D)  $\frac{1 + \sqrt{x}}{1 - x}$                       (E) none of these                      [10] \_\_\_\_\_

Grades JHS  
2003 Math Contest Exam

Exam	T1	T2	T3	T4	T5
P1	d	b	e	d	c
P2	b	e	c	d	c
P3	c	a	d	c	c
P4	d	d	e	a	a
P5	a	d	e	b	d
P6	e	b	e	b	e
P7	b	b	d	d	c
P8	d	e	b	b	d
P9	b	b	d	c	d
P10	e	c	d	d	e