

WCTM MATHEMATICS CONTEST, 1998

Test 1

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

CLASS 7 & 8 Grade

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

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

1. Sam bought 3 items at an average cost of \$29.50. Two of the items cost \$28.31 and \$33.50 respectively. The price of the third item is:

- (A) \$27.79    (B) \$24.50    (C) \$30.91    (D) \$26.69    (E) none of these    [1] \_\_\_\_\_

2.  $-2a[2b(3 + 4a) + (a - 2)] =$

- (A)  $-12ab - 16a^2b - 2a^2 - 4a$     (B)  $-4ab - 12a^2b$     (C)  $-12ab - 10a^2 + 4a$   
 (D)  $-12ab - 16a^2b - 2a^2 + 4a$     (E)  $12ab + 16a^2b + 2a^2 - 4a$     [2] \_\_\_\_\_

3.  $\frac{1}{\frac{1}{p} + \frac{1}{3}} =$

- (A)  $p + 3$     (B)  $\frac{3p}{3 + p}$     (C)  $\frac{3 + p}{3p}$     (D)  $\frac{3p}{2}$     (E) none of these    [3] \_\_\_\_\_

4. Some computer software was purchased at 75% of the list price of \$150. The sales tax rate is 6%. The total cost of the software purchase is:

- (A) \$121.50    (B) \$112.50    (C) \$119.25    (D) \$141.00    (E) none of these    [4] \_\_\_\_\_

5. 3 bananas weigh 23 ounces and cost 92 cents. To the nearest cent, the price per pound for bananas is:

- (A) 39 cents    (B) 49 cents    (C) 31 cents    (D) 59 cents    (E) none of these    [5] \_\_\_\_\_

6. If  $|x - 3| = 7$  then  $x$  is:

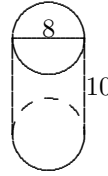
- (A) 10    (B) 7 or -7    (C) -4 or 10    (D) 4 or 10    (E) -10 or 4    [6] \_\_\_\_\_

7.  $(3x^2 + 5x - 2)(-x^3 + 3) =$

- (A)  $-9x^4 - 3x^3 - 5x^2 - 6$     (B)  $-3x^4 - 6$     (C)  $-3x^2 + 5x - 6$   
 (D)  $-3x^5 - 5x^4 + 2x^3 + 9x^2 + 15x - 6$     (E) none of these    [7] \_\_\_\_\_

8. Mr. Lee invested some money at 8% per year and \$500 at 12% per year. The interest was paid every 3 months. His first interest checks totaled \$280. How much did he invest at 8%?

- (A) \$13,250    (B) \$3,000    (C) \$2,750    (D) \$10,700    (E) none of these    [8] \_\_\_\_\_



9. The cylindrical tank has a diameter of 8' and a height of 10'. The total surface area is:

- (A) 640 sq ft.    (B)  $160\pi$  sq ft.    (C)  $96\pi$  sq ft.    (D)  $112\pi$  sq ft.    (E) none of these    [9] \_\_\_\_\_

10. A trip from Podunk to Hicksville takes 6 hours at 45 miles per hour. The same trip at 65 miles per hour will take (to the nearest minute):

- (A) 4 hours    (B) 4 hours 9 minutes    (C) 4 hours 10 minutes    (D) 5 hours 19 minutes    (E) none of these    [10] \_\_\_\_\_

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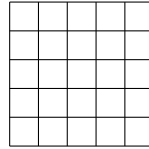
Test 2

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

CLASS 7th & 8th Grade

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

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



1. There are 25 unit squares in the figure. The number of  $2 \times 2$  squares with corners at the intersection of the grid lines is:

- (A) 9                      (B) 20                      (C) 16                      (D) 12                      (E) none of these                      [1] \_\_\_\_\_

2. If  $3x - 7 - 5x = 4 + 7x + 2$ , then  $x =$

- (A)  $-\frac{13}{5}$                       (B)  $\frac{13}{5}$                       (C)  $-\frac{13}{9}$                       (D)  $\frac{13}{9}$                       (E)  $-\frac{11}{4}$                       [2] \_\_\_\_\_

3.  $\left(\frac{x^{3/2} \cdot x^{1/8}}{x^2}\right)^3 =$

- (A)  $x^{9/32}$                       (B)  $\frac{1}{x^{9/8}}$                       (C)  $x^{-9/32}$                       (D)  $x^{9/8}$                       (E)  $x^{21/8}$                       [3] \_\_\_\_\_

4. A rectangular sheet of paper is divided into 336 unit squares by horizontal and vertical lines. There are 5 more squares in each vertical strip than there are squares in each horizontal strip. The number of squares in each horizontal strip is:

- (A) 21                      (B) 16                      (C) 12                      (D) 28                      (E) 8                      [4] \_\_\_\_\_

5. The number 1998 will appear in which column set?

A	B	C	D	E	F	G
1	2	3	4	5	6	7
12	11	10	9	8		
		13	14	15	16	17
22	21	20	19	18		

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

6. The mean (average) of 20 numbers is 20. The mean of a different set of 50 numbers is 30. The mean of the combined set of numbers is (to the nearest .01):

- (A) 25.00      (B) 27.14      (C) 28.13      (D) 50.00      (E) none of these                      [6] \_\_\_\_\_

7. A car travels 80 kmh (kilometers per hour). How many revolutions would a 77cm diameter tire make in 1 hour?

- (A)  $\frac{4000}{.77\pi}$       (B)  $\frac{8000}{.77\pi}$       (C)  $\frac{80,000}{.77\pi}$       (D)  $\frac{160,000}{.77\pi}$       (E)  $\frac{100,000}{\left(\frac{.77}{2}\right)^2 \pi}$       [7] \_\_\_\_\_

8. Mr. Cruz agreed to pay his son 10 cents for each correct homework problem and fine him 5 cents for each incorrect or “not attempted” problem. There were 30 problems on the assignment. Mr. Cruz paid his son 90 cents. The number of right answers minus the number of wrong answers is:

- (A) 1      (B) 0      (C) 3      (D) 2      (E) -1      [8] \_\_\_\_\_

9. Let  $a \oplus b \equiv a(b - 3)$  and  $a \ominus b = a(b + 3)$ . Then  $(2 \oplus 3) \ominus 2 =$

- (A) 6      (B) 4      (C) 3      (D) 0      (E) 60      [9] \_\_\_\_\_

10. A whole number is perfect if  $n$  is equal to the sum of its divisors (not including  $n$  itself). Which are perfect numbers?

- (A) 6 and 12      (B) 6 and 28      (C) 14 and 28      (D) 10 and 12      (E) none of these      [10] \_\_\_\_\_

WCTM MATHEMATICS CONTEST, 1998

Test 3

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

CLASS 7th & 8th Grade

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

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

1.  $(3x^{1/3})^2 =$

- (A)  $3x^{2/3}$       (B)  $6x^{2/3}$       (C)  $9x^{1/6}$       (D)  $3x^{1/6}$       (E)  $9x^{2/3}$       [1] \_\_\_\_\_

2. A triangle has an area of 18 square inches. The base and altitude are whole numbers. The base cannot be

- (A) 8      (B) 6      (C) 4      (D) 9      (E) 12      [2] \_\_\_\_\_

3. The number of positive whole numbers less than 100 that are divisible by 2 or 3 is:

- (A) 68    (B) 67    (C) 82    (D) 66    (E) 33      [3] \_\_\_\_\_

4. The number of different positive divisors of 1998 is

- (A) 6      (B) 16      (C) 3      (D) 8      (E) none of these      [4] \_\_\_\_\_

5. If  $3x - 7 = 2$ , then  $4x - 3 =$

- (A) 3    (B)  $-\frac{29}{3}$     (C) 7    (D) 8    (E) 9      [5] \_\_\_\_\_

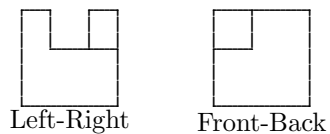
6.  $213_5 = 2 \cdot 5^2 + 1 \cdot 5 + 3 = 58$  (in base 10). So in base 10 notation  $423_5 =$


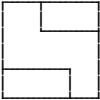
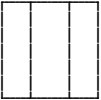
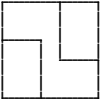
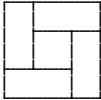
- (A) 53      (B) 33      (C) 113      (D) 63      (E) none of these      [6] \_\_\_\_\_

7. How many 3-digit numbers, with no two digits the same, can be made using the digits 1,2,3,4,7,9?

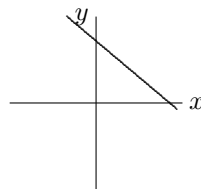
- (A)  $10 \cdot 9 \cdot 8$     (B)  $6^3$     (C)  $6 \cdot 5 \cdot 4$     (D)  $\frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1}$     (E)  $\frac{10 \cdot 9 \cdot 8}{3 \cdot 2 \cdot 1}$       [7] \_\_\_\_\_

8. Left, Right, Front and Back views of a solid are shown. The view from above is:



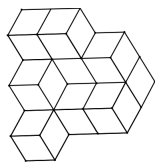
- (A)  (B)  (C)  (D)  (E)  [8] \_\_\_\_\_

9. The equation of the graph is one of the following. Which one is the correct equation. (*Note*: the scales on the axes are not necessarily the same.)



- (A)  $y = x + 2$  (B)  $y = 2x$  (C)  $y = -x$  (D)  $y = -x + 2$  (E)  $y = -x - 1$  [9] \_\_\_\_\_

10. A set of 13 unit cubes is glued together as shown. The surface area of the stack is:



- (A) 21 sq units (B) 42 sq units (C) 78 sq units (D) 28 sq units (E) 30 sq units [10] \_\_\_\_\_

WCTM MATHEMATICS CONTEST, 1998

Test 4

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

CLASS 7th & 8th Grade

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

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

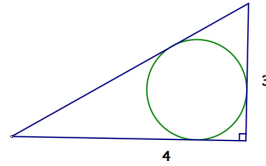
1. At a party with 15 people each person shakes hands exactly once with all other guests. The total number of handshakes is:

- (A)  $14 \cdot 15$       (B)  $\frac{14 \cdot 15}{2}$       (C)  $\frac{14 \cdot 14}{2}$       (D)  $15 \cdot 15$       (E)  $\frac{15 \cdot 15}{2}$  [1] \_\_\_\_\_

2. At Punkin Center Junior High 20 students take Course A, 18 students take Course B, 10 students take Course C, 2 students take all 3 courses, 13 students take exactly 2 of the 3 courses, 9 students take none of the courses. The number of students at Punkin Center Junior High is:

- (A) 72      (B) 24      (C) 40      (D) 35      (E) 46      [2] \_\_\_\_\_

3. A circle is inscribed in a right triangle as shown. Find the area inside the triangle and outside the circle.



- (A)  $12 - \pi$       (B)  $\pi$       (C) 6      (D)  $6 - \frac{\pi}{2}$       (E)  $6 - \pi$       [3] \_\_\_\_\_

4. 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)  $10 \cdot 9 \cdot 8 \cdot 7$       [4] \_\_\_\_\_

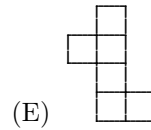
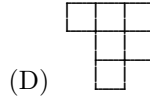
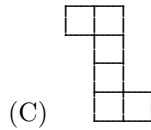
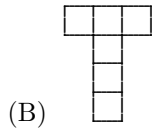
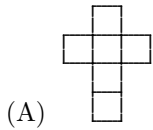
5. If the first day of July is on Friday then the 23rd day of July is on:

- (A) Friday      (B) Monday      (C) Saturday      (D) Sunday      (E) none of these      [5] \_\_\_\_\_

6. If  $a = \frac{1}{3}$  and  $b = \frac{1}{2}$  then  $(a - b)^2$  is:

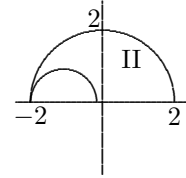
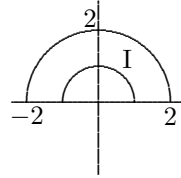
- (A)  $\frac{1}{12}$       (B)  $\frac{13}{36}$       (C)  $-\frac{5}{36}$       (D)  $\frac{1}{36}$       (E)  $-\frac{1}{36}$       [6] \_\_\_\_\_

7. Which figure cannot be folded to make a cube?



[7] \_\_\_\_\_

8. The curved boundaries are circles: which property does Area I and Area II satisfy?



- (A) Area I=Area II
- (B) Area I=1/2 Area II
- (C) Area I=3/2 Area II
- (D) Area I<Area II, but more information needed to find how much smaller
- (E) Area I> Area II, but more information needed to find how much more

[8] \_\_\_\_\_

9. If  $\frac{x^2 - 3y}{x} = k$  then  $y =$

- (A)  $\frac{3x^2 + kx}{3}$
- (B)  $\frac{k - x}{-3}$
- (C)  $\frac{x - k}{-3}$
- (D)  $\frac{kx - x^2}{3}$
- (E)  $\frac{x^2 - kx}{3}$

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

10. Leslie has 3 times as many pairs of earrings as Kelly. Leslie has at most 17 pairs of earrings. So Kelly has at most:

- (A) 6 pairs of earrings
- (B) 5 pairs of earrings
- (C) 15 pairs of earrings
- (D) 18 pairs of earrings
- (E) 51 pairs of earrings

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

WCTM MATHEMATICS CONTEST, 1998

Test 5

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

CLASS 7th & 8th Grade

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

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

1. An equation of the line through  $(-2, 3)$  and with slope 7 is:

- (A)  $y = 7x + 17$       (B)  $y = 7x - 5$       (C)  $y = 7x - 17$       (D)  $y = 7x - 17$       (E)  $7y = x - 19$   
 [1] \_\_\_\_\_

2. The sum of the first 30 items of the sequence 2, 3, 4, 5, ... is:

- (A) 990      (B) 31      (C) 62      (D) 463      (E) none of these  
 [2] \_\_\_\_\_

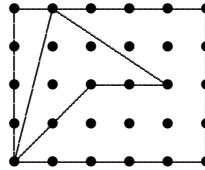
3. The greatest common divisor of 1998 and 2001 is:

- (A) 1      (B) 666.67      (C) 9      (D) 3      (E) none of these  
 [3] \_\_\_\_\_

4. The ratio of  $\frac{3}{5}$  to  $\frac{7}{8}$  expressed as a common fraction is:

- (A)  $\frac{24}{12} = 2$       (B)  $\frac{24}{35}$       (C)  $\frac{21}{40}$       (D)  $\frac{35}{24}$       (E)  $\frac{11}{35}$   
 [4] \_\_\_\_\_

5. The shaded area is:

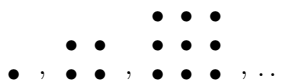


- (A) 20      (B) 5      (C) 21      (D) 18      (E) 15  
 [5] \_\_\_\_\_

6. A sequence is produced by the formula  $a_{n+1} = 2a_n + 2$ . If  $a_5 = 30$  then  $a_1 =$

- (A) 1      (B) 0      (C) 2      (D) 6      (E) 3  
 [6] \_\_\_\_\_

7. The difference between the number of dots in the 8th picture in the sequence and the 7th picture is:



- (A) 16      (B) 14      (C) 13      (D) 15      (E) none of these  
 [7] \_\_\_\_\_

8. The price of the stockmarket stock fell by 20% in October and then rose by 15% of the October price by January 1. Which fraction represents the ratio of the January 1 price compared to the September 31 price?

- (A)  $\frac{3}{4}$       (B)  $\frac{23}{25}$       (C)  $\frac{8}{35}$       (D)  $\frac{2}{3}$       (E)  $\frac{4}{5}$       [8] \_\_\_\_\_

9. The ratio of  $\frac{3}{5}$  to  $\frac{4}{9}$  is:

- (A)  $\frac{12}{45}$       (B)  $\frac{27}{20}$       (C)  $\frac{47}{45}$       (D)  $\frac{7}{45}$       (E)  $\frac{7}{14}$       [9] \_\_\_\_\_

10. Anna and Bill play a game by choosing 2 different numbers from the set  $\{1, 2, 3, 4\}$ . If the sum is larger than the product Anna wins. Otherwise Bill wins. The probability that Anna wins is:

- (A)  $\frac{1}{3}$       (B)  $\frac{1}{6}$       (C)  $\frac{5}{6}$       (D)  $\frac{2}{3}$       (E)  $\frac{1}{2}$       [10] \_\_\_\_\_

Grades HS  
1998 Math Contest Exam

Exam	T1	T2	T3	T4	T5
P1	D	C	E	B	A
P2	D	C		C	E
P3	B	B		E	D
P4	C	B		B	B
P5	E	E		C	E
P6	C	B		D	B
P7	D	C		D	D
P8	A	D		A	B
P9	D	D		E	B
P10	B	B		B	E