ECML

2013

Algebra 1

ESSEX COUNTY MATH LEAGUE
May 22, 2013
Algebra 1

DIRECTIONS: You **may** write on this test. Be sure that your name, subject, and school (including town name) are on the answer sheet. Mark the answer sheet with dark, careful marks using a #2 pencil. Your score will be determined by the number of correct answers. Incorrect or blank answers will **NOT** lower your score. You **MAY** use only a SAT I approved calculator on this test. The answer to the tie-breaker should be placed on the answer sheet in the place indicated by the proctors. The tie-breaker will be scored, only in the case of a tie between the top scorers, and will not count as part of the team score.

The answer to part e) will always be **NG** for "Not Given". This is a viable answer and means that the correct answer is **not** one of the first four listed.

1) Evaluate: $-3(a^3b^2c)^3 + (-2abc^2)$ for a=-1, b=2, and c=-1/2.

   A) -24   B) -23   C) 24   D) 25   E) NG

2) Find the smaller value of x for which: $6x^2 + 6 = 13x$

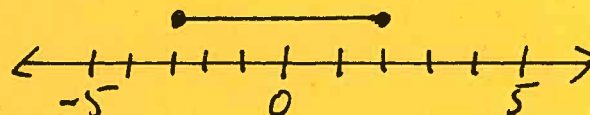   A) 3/2   B) 1   C) 2/3   D) -2/3   E) NG

3) Solve for x: $2(x^2 - 2x + 1) - 3(x + 5) = (x + 1)(2x - 7)$

   A) -3   B) -2   C) -1   D) 0   E) NG

4) Solve for x: $-2(x+1) + 5 \le x - 4(x - 2)$

   A) $x \ge 1$ B) $x \le 5$ C) $x \ge 8$ D) $x \le 11$ E) NG

5) Which sentence best describes the graph.

   A) $x \ge -3$ or $x \le 2$ B) $x \le -3$ or $x \ge 2$

   c) $-2 \le x \le 3$ D) $-3 \le x \le 2$ E) NG

6) Simplify: $(-2a^3bc^2)(a^2b^2c)^2$

A) $-2a^{10}b^6c^6$ B) $4a^{10}b^5c^4$ C) $-2a^{12}b^4c^4$ D) $4a^7b^5c^4$ E) NG

7) Find the value of $\left|3a-2b^2\right|$, when a=-2, and b=-1

A) 8   B) 6   C) 4   D) 2   E) NG

8) Find the difference when x^3-5x^2-x-8 is subtracted from the product of x^2-2x+3 and $x-4$.

A) x^3+3x^2+6x-4 B) $x^3-x^2+12x-4$

c) $3x^3+6x-4$ D) $-x^2+12x-4$ E) NG

9) Simplify: $(3x+2y)(2x-y)-(x+2y)(3x-y)$

A) $3x^2-4xy-4y^2$ B) $3x^2-4xy$

c) $3x^2-6xy-4y^2$ D) $3x^2-6xy$ E) NG

10) Simplify: $\dfrac{\dfrac{1}{a}-\dfrac{1}{b}}{\dfrac{1}{a^2}-\dfrac{1}{b^2}}=$

A) $\dfrac{ab}{a+b}$ B) $\dfrac{ab}{a-b}$ C) $\dfrac{1}{a+b}$ D) $\dfrac{1}{a-b}$ E) NG

11) What is the result when the product of $4x^{3n-4}$ and $3x^{n+5}$ is divided by $2x^{2-n}$?

A) $6x^{3n+3}$ B) $6x^{3n-1}$ C) $6x^{5n+3}$ D) $6x^{5n-1}$ E) NG

12) Tom and Bill each rode a 10-mile leg of a bicycle relay race. If Tom's rate was 15 mph and the two of them together averaged 12 mph, what was Bill's rate?

A) 9 mph   B)   9.5 mph   C)   10 mph   D)   10.5 mph   E)   NG

13) Simplify: $\dfrac{2}{x^2-1} - \dfrac{3}{x-1} + \dfrac{1}{x+1}$

A) $\dfrac{2}{x+1}$ B) $\dfrac{-2}{x+1}$ C) $\dfrac{2}{x-1}$ D) $\dfrac{-2}{x-1}$ E)   NG

14) Factor, completely: $4-(2x-y)^2$

A) $(2-2x+y)(2+2x-y)$ B) $(2-2x-y)(2+2x+y)$
C) $(2x-y-2)(2x-y+2)$ D) $(2x+y-2)(2x+y+2)$ E)   NG

15) Solve for x: $\dfrac{1}{2x} - \dfrac{1}{5x} = \dfrac{1}{3x} + \dfrac{1}{10}$

A) -3   B)   -5/3   C)   -1/3   D)   3   E)   NG

16) If $-0.3 < x < 0.2$, then x could NOT be:

A) -1/5   B)   -1/3   C)   1/7   D)   1/8   E)   NG

17) Which of the following expressions has the maximum value if: x=-1, y=0, and z=2?

A) $(x+y+z)^3$ B) $x^2+2xy+3z$ C) $xyz+x^2y^2z^2$ D) $(x-y-z)^2$ E)   NG

18) Solve for x in terms of a: $2a(3-x)=4x+4$

A) $\dfrac{3a-2}{a-2}$ B) $\dfrac{3a+2}{a-2}$ C) $\dfrac{3a-2}{a+2}$ D) $\dfrac{3a+2}{a+2}$ E)   NG

19) Sara and Jane work on a factory assembly line putting small cars into boxes. On a certain day, Sara boxed 384 less than twice the number Jane boxes, while together they boxed 1146 of the toy cars. How many did Sara box that day?

A) 765   B)   636   C)   510   D)   254   E)   NG

20) The sum of the digits of a 3-digit number is 20. When the units digit is moved in front of the other two digits, so it is in the hundreds place, the resulting new 3-digit number is 252 more than the original one. What was the units digit of the original number?

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

Tie Breaker. This question will only be scored to break a tie amongst the high scorers on this contest. It will not count as part of the team score.

Jack and Jill start walking along a road which averages a 2% grade. They average 4 mph as they walk. After 75 minutes they stop for a rest. What was the change in elevation, to the nearest foot, they experienced during their walk?