Meramec College Algebra TEST 1 Critique Spring 2006

1) A formula must contain an equal sign.

For example $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ is **not** the Quadratic Formula.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ is the Quadratic Formula.

2) It is incorrect to say a point is positive.
Points are neither positive nor negative.
Positive or negative designation is reserved for Real Numbers.
Positive or negative designation indicates a relation to the number 0.

3) Two sets are not equivalent. There is no such concept.
Two sets may be equal, but they are not equivalent.

4) Two equations are not equal. There is no such concept.
Two equations may be equivalent, but they are not equal.

5) Two inequalities may not be equal. There is no such concept.
Two inequalities may be equivalent, but they are not equal.

6) Leading coefficient and first coefficient do not mean the same thing.
The term first coefficient is usually not used.
It might be used to mean the coefficient of the term written first.
Leading coefficient is the coefficient is the coefficient of the leading term.
The leading term is the term with the largest degree.
In $5x^4 + 2X^8 - 57$ the first coefficient is 5 and the leading coefficient is 2.

7) Circles do not have origins. Circles do not have vertices.

8) NEVER write tow operation symbols next to each other.
6 + - 3i has not meaning

9) {4, -2}, (4, -2) and (-2, 4) mean very different things.
{4, -2} is the set containing the numbers 4 and -2.
(4, -2) is the point in a two-dimensional coordinate system whose first coordinate is 4 and whose second coordinate is -2.
(-2, 4) may be the open interval on the Real Number line which contains all numbers between -2 and 4, but doe not contain either -2 or 4.
(-2, 4) might also mean the point in a two-dimensional coordinate system whose first coordinate is -2 and whose second coordinate is 4.

10) As far as I know, the word flip does not appear in any mathematics dictionary.

11) It is incorrect to say "times the two numbers".
It is correct to say "multiply the two numbers".

12) To define the principle square root of a negative number an equation is required.
To complete the definition:
If k is a positive real number then the principal square root of its opposite -k is defined by_____________ it is necessary to write $\sqrt{-k} = i\sqrt{k}$. To simply write $i\sqrt{k}$ is unsatisfactory.

13) A single arrow $\rightarrow$ has no meaning in the mathematics we are doing. It has a meaning in Calculus. The double arrow $\Rightarrow$ means implies, it does not take the place of the = sign.

14) When the intent is to substitute -1 into an expression such as x^5, it is incorrect to write -1^5. In that case it is required to write $(-1)^5$.

15) Do not leave complex fractions in your answers.

16) When I see a table of values to graph the quadratic equation y = (-x + 3)(x + 5), I am convinced that you know virtually nothing about quadratic equations in two variables. It is as if your graphing development was arrested at the sixth grade.

17) In Algebra it is better to always use juxtaposition rather than × to indicate a product. That × symbol worked when dealing strictly with numbers in arithmetic, but it leads to confusion in algebra. Consequently you should write (0.17)(120) rather than 0.17×120.

18) $y = \frac{17x - \sqrt{5}x}{3} + 3$ is NOT written in slope-intercept form, but $y = \left(\frac{17 - \sqrt{5}}{3}\right)x + 3$ is written in slope-intercept form.

19) The product of two complex numbers is a complex number not a set. The product of two complex numbers in one of the test questions should have been 31 – I not {31 – i}.

20) When asked to compute the product (3 + 2i)(7 – 5i) you should conclude that 31 – i is the product not the solution. You are not solving an equation. When showing the work for this multiplication you should write something like:
$(3 + 2i)(7 - 5i) = 21 - 15i + 14i - 10i^2 = 31 - I$ (Note the use of the equality symbol)
You should not write (3 + 2i)(7 – 5i)
$21 - 15i + 14i - 10i^2$ $i^2 = -1$ 31 – i is the desired solution
21 -1i – (-1)(10) 21- 1i - -10

21) Do not refer to $\sqrt{3x-4} = \sqrt{x^2+3}$ as a problem. It is an equation.
You would not refer to $A = \pi r^2$ as a problem.
You would not refer to $F = \frac{9}{5}C + 32$ as a problem

22) To show your work in something like the addition (3 – 7i) + (3 + 4i) means to write something like (3 – 7i) + (3 + 4i) = (3 + 3) + (-7 + 4)i = 6 - 3i
Not something like (3 – 7i) + (3 + 4i) = 6 – 3i 3 + 3 = 6 -7i + 4i = -3i

23) When asked to find a set your work should terminate with something in set notation.
When asked to use the Quadratic Formula to find the solution set for $2x^2 + x - 1 = 0$.
You should present the following:

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-1 \pm \sqrt{1^2-(4)(2)(1)}}{(2)(2)} = \frac{-1 \pm \sqrt{9}}{4} = \frac{-1 \pm 3}{4}$$

And you should conclude that the solution set for $2x^2 + x - 1 = 0$ is $\left\{-1, \frac{1}{2}\right\}$

24) If you want to draw a box around your "answer" the in the above question the box should not enclose the two numbers -1 and 1/2, but should enclose the whole thing as shown here:

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-1 \pm \sqrt{1^2-(4)(2)(1)}}{(2)(2)} = \frac{-1 \pm \sqrt{9}}{4} = \frac{-1 \pm 3}{4}$$

And you should conclude that the solution set for $2x^2 + x - 1 = 0$ is $\left\{-1, \frac{1}{2}\right\}$

Because my question is designed to show me that you know how to properly use the Quadratic Formula.

25) The following is a very poor unacceptable format for present your work with the Quadratic Formula in the above problem.

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} \qquad x = \frac{-1 \pm \sqrt{9}}{4} \qquad x = \frac{-1 \pm \sqrt{9}}{4}$$

$$x = \frac{-1 \pm \sqrt{1^2-4(2)(-1)}}{2(2)} \qquad x = \frac{-1+3}{4} \qquad x = \frac{-1-3}{4}$$

$$x = \frac{1}{2} \qquad x = -1$$

$\left\{\frac{1}{2}, -1\right\}$ is the solution set for $2x^2 + x - 1 = 0$

Notice the reader is given no clue with respect to the order of presentation of these nine or ten statements.

26) The formula for the circumference of a circle is C = 2πr.
It is neither $C= 2\pi r^2$ nor $C = \pi r^2$

27) To find the circumference of a circle of radius 2 you must use the formula C = 2πr to calculate C = 2π2=4π. If you used the incorrect formula $C = \pi r^2$ and calculated the circumference to be $C = \pi 2^2 = 4\pi$, you received no credit because the work was completely wrong.

28) I am unable to interpret statements like the following:
$(x – 3)^2 + (y + 2)^2 = 36$ is the circumference with origin at (9, -4) and radius at 6.
You must learn the language!

29) You must start thinking of a fraction as a single number not two distinct numbers. When faced with the equation $F-32=\frac{9}{5}C$, you should thing of multiplying both sides of the equation by $\frac{5}{9}$ rather than multiplying both sides by 5 to get the equation 5F – 160 =9C and then dividing by 9 to obtain $\frac{5}{9}F-\frac{160}{9}=C$. The two step method is longer, unnecessary, and produces an awkward and quite unusual formula for converting degrees Fahrenheit to degrees Centigrade.

30) The process commonly referred to as "cross multiplication" is not a good method to use to solve rational equations. It generally "blows things up" so that you are dealing with higher degree polynomials than is necessary. When the degree exceeds 2, the polynomials are hard to work with. A much better practice is to multiply both sides of the equation by the LCD (or something close).That is why that method is presented in class, on the website, in the College Algebra textbook, in the Intermediate Algebra textbook, in the Elementary Algebra textbook, and probably in your high school algebra textbooks. Cross multiplication is tantamount to multiplying both sides of the equation by the product of all the denominators. Cross multiplication is usually performed incorrectly if more that one algebraic fraction appears on a side of the equation.

31) When graphing an interval or ray on the number line, you should not feel compelled to mark and label all the integer points inside the interval. Of course you should mark and label the endpoints.

Preferred

Not preferred

Not preferred

32) In one of the test questions you were asked to find the solution set for a rational equation. After multiplying both sides of the equation by the LCD and solving the resulting equation the solution set {-1} was obtained. However, -1 caused the denominators to be zero and therefore was not a solution. In this situation it is correct to conclude that the solution set is the null set. It is also correct to conclude that -1 is not a solution. In general, it is risky to conclude that x ≠ -1. That kind of conclusion is valid (for a different reason) with rational equations, but with other types of equations which yield "extraneous" solutions that kind of conclusion might be false.

33) I am unable to interpret statements like:
The $3x - 4 = x^2 + 3$ is the subset for the equation of $\sqrt{3x-4} = \sqrt{x^2+3}$

34) Do not write $\frac{x = -b \pm \sqrt{b^2 - 4ac}}{2a}$

35) Do not write $3 + \sqrt{-5} = 3 + \sqrt{5i}$ It should be $3 + \sqrt{-5} = 3 + \sqrt{5}i$

36) Read the questions carefully. Answer the question that is posed.
Suppose A is the solution set for $x^3 + 2x + 17 = 43$ and
B is the solution set for $(x + 1)(x^3 + 2x + 17) = (x + 1)(43)$
What is the relationship between A and B?
This is a question about solution sets. A and B are not equations, they are solution sets of equations. Comments about the need to test solutions are not a part of a correct answer to this question.

37) Stop overwriting

38) Answer questions with complete sentences. Note that a statement like
(-2, 4] = { x | -2 < x ≤ 4 } is a complete sentence.
What is the subject? What is the verb? What is the object?

39) When asked to sketch the graph of an equation like y = (-x + 3)(x + 5) you definitely DO NOT perform the multiplication. Multiplication obscures the x-intercepts and reveals no other information.

40) The multiplicative inverse of a complex number is not its reciprocal.

41) Circles do not have midpoints.

42) Parabolas do not have slopes.

43) You should write $\frac{15}{4\pi}$ inches rather than $\frac{15 \text{ inches}}{4\pi}$

44) A single equation cannot be equivalent. Equivalence is a comparison of two equations.
"Both equations are equivalent" is incorrect.
"The equation x + 3 = 0 is equivalent" is incorrect.
"The equation is still equivalent" is incorrect.

45) If you try to write x = 0 in words you should write "x is equal to 0" or "x equals 0", but you should not write "x equals to 0". It is best to simply write x = 0.

46) (3 + 2i)(7 – 5i)	(3 + 2i)(7 – 5i)
$21 - 15i + 14i - 10i^2$	$= 21 - 15i + 14i - 10i^2$
21 – i + 10	= 21 – i + 10
= 31 – i	= 31 – i
Nothing tells me that the product is 31 – i .	The chain of equalities tells the reader that the product is 31 – i .

47) When discussion a quadratic $ax^2 = bx + c$, the term ax^2 is called the leading term not the leading expression.

48) (3 – 7i) + (3 + 4i)
3 + 3 = 6 – 7i + 4i VERY BAD ERROR 3 + 3 = 6 NOT 6 – 7i + 4i
= 6 – 3i

49) When 1 is substituted into $3x^4$ you obtain 3(14) = 3 NOT $3^4 = 81$