Oahu Mathematics League
Guidelines for Forms of Answers

Case	Acceptable	Unacceptable
A. Simplification		
All answers must be simplified.		5^2, $2x+3x$
Simplification means the following		
1. Simplest radical form.	$5\sqrt{2}$, $\frac{2\sqrt{3}}{3}$, $\frac{\sqrt{6}}{2}$	$\sqrt{50}$, $\frac{2}{\sqrt{3}}$, $\sqrt{\frac{2}{3}}$
2. All fractions reduced to lowest terms. No complex fractions.	$\frac{63}{2}$	$\frac{\frac{7}{2}}{9}$
3. An improper fraction is acceptable, as is the equivalent mixed number.	$\frac{7}{2}$, $3\frac{1}{2}$	
4. No number or terms may be added to zero.	$2x$, $3i$	$2x+0$, $0+3i$
5. No number or terms may be multiplied by or divided by 0, 1 or –1.	$2x+y$, 7	$2x+1y$, $7+0i$
6. No number or term may be raised to the power 0 or 1.		
B. Special symbols and terms		
1. The "Computer Zero" The symbol : "$\varnothing$ " means "empty set" and therefore, when written by itself, will not be treated as the number "0".	$1\varnothing$	$\varnothing$
2. The Functional Exponent –1 If f is any function, the notation means the inverse of f, not the reciprocal of f.		

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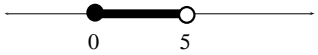
3. Connectives a. Multiple solutions should be separated by a comma	$x = \pm 1, 0$ $x = 1, -1, 0$ $x = 1$ or $x = 2$ $x = 1,\ x = 2$	$x = 0\ \pm 1$ $x = 1$ and $x = 2$
b. In any answer containing an inequality only the verbal connectives ("and"/ "or") may be used.	$1 < x < 2,\quad x < 2$ and $x > 1$ $x < 0$ or $x > 5$	$1 < x, x < 2,\quad x > 2$ *or* $x > 5$ $x < 0, x > 5,\quad x < 1$ and $x > 2$
c. Connectives between sets (including intervals) must be either "$\cup$" (union) or "$\cap$" (intersection).	$(-\infty, 0) \cup (5, \infty)$ $[0, 0] \cup [5, \infty)$	$(-\infty, 0)$ or $(5, \infty)$ $(-\infty, 2)$ and $(1, \infty)$ $x = 0$ or $[5, \infty)$
d. The symbols "$\vee$" (disjunction) and "$\wedge$" (conjunction) are to be used only for statements in symbolic logic.		
4. The shorthand use of "plus or minus" ($\pm$) is acceptable, but there must be no possibility of ambiguity.	$2 \pm a \equiv 2 + a,\ 2 - a$ $y = \pm x \equiv y = x, y = -x$ $x = \pm 2, \pm 4$	$(\pm 2, \pm y)$ Is this 2 points or 4 points?
5. All answers are to use the minimum number of grouping symbols ("( )"., "[ ]", "{ }") possible. <u>However one extra grouping symbol per answer is acceptable</u>. Also factored forms of an answer are acceptable if	$(4xy)(1 + 3y - 7xy^2)$	
i. the answer is completely factored	$(x-3)^2(3x-1+3y+z)$ $(x-3)(x-3)(3x-1+3y+z)$	$(x^2-9)(3x-1+3y+z)$
ii. each of the individual factors is simplified, and		
iii. the product of two or more monomials is expressed as a single monomial.	$4xy(1+3y-7xy^2)$	$(4x)(y)(1+3y-7xy^2)$ $(x-3)^2\{[\{3x-1\}+3y]+z\}$

Case	Acceptable	Unacceptable
6. If the answer contains a radical, apply rule 5. The form of an answer is unacceptable if the form would be unacceptable when the radical is replaced by a variable.	$(2+3\sqrt{5})$ square units (2x - 5), $-8+4\sqrt{3}$ $\frac{(x+5)}{2}$, $4\sqrt{3}-8$ or $4(\sqrt{3}-2)$ $\frac{2+\sqrt{3}}{4}$ or $\frac{1}{2}+\frac{\sqrt{3}}{4}$ $a\sqrt{3}+2\sqrt{3}$ or $(a+2)\sqrt{3}$ $\frac{3a+4}{6}\sqrt{3}$ or $\left(\frac{a}{2}+\frac{2}{3}\right)\sqrt{3}$	$2\left(2\sqrt{3}-4\right)$
7. The use of the slash (/) is strongly discouraged but it may be used only when there is no possibility of ambiguity.	x/y 5/2	2 1/2 $x+5/2$

C. Notes

1. a. Exact answers to any problem must be given, except as permitted by the problem directions.	$\sqrt{2}$ π		1.414 3.14, $\frac{22}{7}$
b. The "scientific" convention (round to the nearest even digit) and the "5 and over, round up" convention are both acceptable.	0.88, 0.89	What is 0.885 to the nearest hundredth?	
	0.88	What is 0.875 to the nearest hundredth?	0.87
c. If the problem calls for a money answer ($), the fractional part of a dollar must be rounded to the nearest cent.	$ 5 $ 5.00		$ 5.0 $ 5.004

Case	Acceptable	Unacceptable
2. Acceptable answers for Unanswerable Problems Unless the context of the problem clearly indicates otherwise, all problems are to be solved over the set of real numbers. If the problem cannot be answered over the required universal set, answers such as "No solution", "None", "Undefined", "Not defined", or "Does not exist" are acceptable.	List all vertical asymptotes for $f(x) = x^2 + x$ No solution, None Does not exist Undefined, Not defined	$\varnothing$, { }
	Find the solution set for x such that $x > 3$ and $x < 0$. $\varnothing$, { }	No solution, None Does not exist Undefined, Not defined
3. Expressions using absolute value are permitted. Relational statements must express the variable being solved for with the understood coefficient 1.	$0 < m < 40$ $0 < x < 1$ or $3 < x < 4$ $\lvert x \rvert > 2$	$0 < 2m < 80$, $\lvert m - 20 \rvert < 20$ $0 > -m > 40$ $1 < \lvert x - 2 \rvert < 2$
4. Angle measure The problem should indicate whether an angle measure called for is to be degrees or radians. If there is no indication in the problem, either radian or degree measure will be accepted.	Find arcsin 0.5 30, 30°, $\frac{\pi}{6}$, $\frac{\pi}{6}$ radians	
	Solve $\cos x = \frac{1}{2}$, $0 < x < \pi$ $\frac{\pi}{3}$	60, 60°
5. Sets Set notation is called for if the problem asks for the solution set; domain and/or range; intersection, union, and/or complement; or if a set is otherwise specified, such as "Define f in the form $f = \{(x, y) : .....\}$". In such cases, the problem should specify the use of sets through a notation on the answer blank. Directions such as "determine", or "evaluate", or "find $f(x)$" do not call for sets. The direction "solve" is ambiguous, so proper solutions may be written either with or without set notation.		

Case	Acceptable	Unacceptable
a. A finite set may be expressed as a list of elements separated by a comma.	$\{3, 4\}$, $\{x : x = 3,4\}$ $x \in \{3,4\}$	$\{x = 3,4\}$, $x = \{3,4\}$
b. An infinite set of discrete solutions may be expressed as a list of elements followed by an ellipsis (. . .) if the pattern is obvious. For patterns that are not obvious, use a form based on $\{x \mid x = f(n),\ n = 1,2,3, \ldots\}$.	$\{1,4,9,16,\ldots\}$ $\{x : x = n^2, n = 1,2,3,\ldots\}$	$\{1,4,\ldots\}$
c. An infinite set of nondiscrete solutions may be expressed as a closed, open or half-closed (half-open) interval. Graphs of any kind are unacceptable.	$[0, 5)$ $[0, 5]$ $(-\infty, 3)$	 $[-\infty, 3)$
d. Set notation using a dummy variable may use either a colon (:) or a vertical bar (|), and a dummy variable may be used as long as the same variable is used on both sides of the colon or bar. Any set other than the universal or empty sets may be expressed with such notation.	$\{x : x = 3,4\}$ $\{z \mid z = 3,4\}$ $\{x : x \neq 3 \text{ and } x \neq 2\}$	$\{x : z = 3,4\}$ $\{x : x \neq 3 \text{ or } x \neq 2\}$ $\{x : x \neq 3,\ x \neq 2\}$
e. The empty set may be expressed in any of the following ways" "Empty set", "Null set", "{ }", or " ".	{ }, $\varnothing$ Empty set, Null set	$\{\varnothing\}$ None, No solution
f. The universal set may be expressed in any of the following ways unless the context of the problem clearly requires otherwise: "R", "{Reals}", or "Set of all real numbers".	Set of all real numbers R, {Reals} {Real numbers} $x \in R$ $\{x : x \in R\}$	Real numbers { R}, Reals

Case	Acceptable	Unacceptable
6. OML Answers for Equations of Conics		
a. OML Standard Form for Conics		
1) $(x-h)^2+(y-k)^2=r^2$	$(x-2)^2+(y+1)^2=\frac{4}{9}$	$9(x-2)^2+9(y+1)^2=4$ $(x-2)^2+(y+1)^2=\left(\frac{2}{3}\right)^2$
2) $(x-h)^2=4c(y-k)$	$(x-h)^2=20(y+2)$ $(x-3)^2=\frac{5}{2}(y+2)$	$(x-3)^2=4\cdot 5(y+2)$ $\frac{1}{3}(x-3)^2=(y+2)$ $2(x-3)^2=5(y+2)$
3) $(y-k)^2=4c(x-h)$		
4) $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$	$\frac{9(x-2)^2}{4}+\frac{(y+1)^2}{16}=1$ $\frac{(x-2)^2}{25}+(y+1)^2=1$ $4(x-2)^2+(y+1)^2=1$ $(x-2)^2+9(y+1)^2=1$	$\frac{(x-2)^2}{\frac{4}{9}}+\frac{(y+1)^2}{16}=1$ $\frac{(x-2)^2}{5^2}+(y+1)^2=1$ $\frac{(x-2)^2}{.25}+(y+1)^2=1$ $\frac{(x-2)^2}{1}+9(y+1)^2=1$
5) $\frac{(y-k)^2}{a^2}+\frac{(x-h)^2}{b^2}=1$		
6) $\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$		
7) $\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$		

Case	Acceptable	Unacceptable
b. OML General Form for Conics $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$, where A, B, C, D, E, and F are non-zero, relatively prime integers.		
7. Intercepts may be written as a single value or as a point.	(0, 3), 3 (2, 0), 2	$y = 3,\ x = 2$
8. If the answer line is pre-labeled then the student's correct answer is acceptable.	$x =$ ___x = 5____ 30°___ °	3 cm^2__ cm^3
9. In order to invalidate an answer based on its form alone, it must be determined that i. the answer can reasonably be interpreted as an incorrect solution, or ii. the answer contains an excessive number of operations yet to be performed. This determination will be made by a committee appointed by the president.		