

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2014-2015

Match 2 Round 1
Arithmetic: Factors
And Multiples

1) _____

2.) _____

3.) _____

1) Find the sum of all of the prime factors of 2310.

2) If N can take on any integer value from 1 through 10, find the least common multiple of all numbers of the form $2^N - 1$ which are divisible by neither 3 nor 7.

3) The greatest common factor of N and 840 is 60. The least common multiple of N and 135 is 2700. Find all possible values of N .

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Match 2 Round 2
Algebra: Polynomials
And Factoring

1.) _____

2.) _____

3.) _____

1) Simplify as much as possible: $(a+2b)^3 - (a-2b)^3$

2) Factor into two binomials: $24x^2 - 55xy - 24y^2$

3) Factor as much as possible: $m^3k^3n^3 - mk^3n^3 + 2m^3k^2n^4 - 2mk^2n^4$

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Match 2 Round 3
Geometry: Pyth. Thm,
Area, Perimeter

1.) _____ cm

2.) _____

3.) _____

1.) The lengths of the two legs of a right triangle differ by 14 cm. The area of the triangle is 120 cm^2 . Find the perimeter of the triangle.

2.) In right triangle ABC, the right angle is at C. $AB = x\sqrt{13}$, $BC = 4x - 2$, and $AC = 5x - 6$. Find the area of the triangle.

3) The two bases of an isosceles trapezoid have lengths x and $(x+16)$. The sides of the trapezoid all have whole number lengths. Find all possible expressions for the area of the trapezoid in terms of x . The height is a whole number.

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Match 2 Round 4
Algebra 2: Inequalities
And Absolute value

1) _____

Remember to use AND or OR or
the shorthand notation for a conjunction
if you answer with $<$, $>$, \leq , or \geq .
You may use union and intersection
symbols if you answer using interval
notation.

2.) _____

3.) _____

1) Find all values of x such that the expression $\frac{4x}{3x-2}$ is positive.

2) Find all values of x such that $|x-2| = 3|x-1| - 4$.

3) Find all values of x such that $5 + |7 - 3x| < 16 - |3x - 2|$

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2014-2015

Match 2 Round 5

Trigonometry:

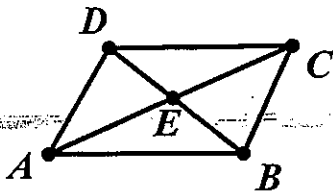
Laws of Sine and Cosine

1.) _____

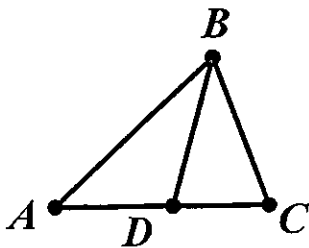
2.) _____ cm

3.) _____

- 1.) In $\triangle XYZ$, $\sin \angle YXZ = \frac{1}{3}$ and $\sin \angle XYZ = \frac{1}{7}$. If $YZ=k$ and $XZ=k^2-2$, find the numerical value of $YZ+XZ$.



- 2.) The diagonals of parallelogram ABCD have length 18 cm and 10 cm and meet at E. Angle CEB measures 60 degrees. Find the perimeter of the parallelogram.



- 3.) \overline{BD} is a median of $\triangle ABC$. If $BD=6$, $BC=7$, and $AD=4$, find the length of \overline{AB} .

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2014-2015

Match 2 Round 6

Writing Equations of Lines

1.) _____

2.) _____

3.) _____

and _____

1.) $x = \frac{1}{6}t + \frac{1}{5}$ and $y = \frac{2}{3}t - \frac{1}{4}$ represent the parametric equations of a line. Find the equation of the line in the form $y=mx+b$.

2.) A circle of radius 5 is centered at (2,3). A radius of the circle lies on the line $4x+3y=17$ and intersects the circle at a point in the second quadrant. Find the equation of the tangent line to the circle through this point. Express your answer in the form $y=mx+b$.

3) The length of the segment connecting the points (1,x) and (x,5) is $\sqrt{10}$. Find the two possible equations for the perpendicular bisector of the segment. Express your answers in the form $y=mx+b$.

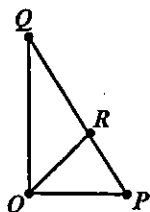
FAIRFIELD COUNTY MATH LEAGUE 2014-15 Match 2 Team Round

- 1.) _____ 4.) _____
 2.) _____ 5.) _____
 3.) _____ 6.) _____

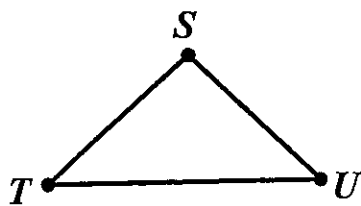
1.) A quadratic polynomial has form $Dx^2 + Ex + F$. D is the greatest common factor of 96 and 216. E is the least common multiple of 57 and 76. F is the smallest natural number that is evenly divisible by 2,3,4,5,6, and 7. Give the complete factoring of $Dx^2 + Ex + F$ with natural number coefficients.

2.) Find all real values of z such that $-z^3 + 3z^2 + 4z - 9 \geq 3$

3.) Find all integers m such that $|m+2| + |m-1| = |m^2 - 9|$



4.) In right triangle OPQ , the right angle is at O , O has coordinates $(2,2)$, P has coordinates $(6,2)$, $\angle OPQ = 60^\circ$, and \overline{OR} is the angle bisector of $\angle POQ$. If R lies on \overline{PQ} , find the x-coordinate of point R .



5.) In ΔSTU , $SU=6$, $ST=x$, $TU=x+2$.

The cosine of $\angle SUT$ is six times the cosine of $\angle TSU$. Find the perimeter of ΔSTU .

6.) Line m has equation $x + y = 10\sqrt{2}$ and line n has equation $x - y = 2\sqrt{2}$. The two lines intersect at point A . A third line intersects line m at point B and intersects line n at point C . The x-coordinates of B and C are each greater than the x-coordinate of A , the area of ΔABC is 32, and the length of \overline{AC} is four times the length of \overline{AB} . Give the equation of \overline{BC} in slope-intercept form.