

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 1
Arithmetic:
Percents

1) 1.25 (accept $\frac{5}{4}$)
=

2.) 10199

3.) 54 %

- 1) 40% of $(12X+5)$ is two less than $(2X+10)\%$ of 80. Find X.
- 2) 30% of 35% of 40% of 45% of N is M, where N and M are both positive integers. What is the smallest possible value of $M+N$?
- 3) 60% of the students at Horsehide High School are girls, and 40% are boys. 35% of the girls are Red Sox fans, while 45% of the boys are Red Sox fans. To the nearest percent, what percent of the Red Sox fans are girls?

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 2
Algebra I: Equations

1.) 1.1

2.) -90

3.) -5, -10

1.) Solve for a:

$$0.4(a - 0.6) = 3a - (2a + 0.9)$$

2) Solve for b:

$$1 + \frac{b}{3 + \frac{b}{5}} = 7$$

3) Solve for c:

$$c - 2 + \frac{c - 5}{c + 4} = c + 3 - \frac{c}{c + 6}$$

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 3
Geometry: Triangles
And Quadrilaterals

1.) $\sqrt{77}$ cm

2.) 60, 120, 588 cm²

3.) $20 + 7\sqrt{2}$ cm

1.) In quadrilateral ABCD, $\angle ABC$ is a right angle. If the diagonal is drawn from A to C, $\angle ACD$ is also a right angle. If $AB=6$, $BC=5$, and $CD=4$, find AD.

2.) The length and width of a rectangle differ by 7 cm. Give the 3 smallest values of areas of rectangles that also meet the condition that the length, width, and diagonal measurement are all integers.

3) The median of an isosceles trapezoid measures 10 cm. The area of the trapezoid is 35 cm². One of the angles of the trapezoid measures 45 degrees. Find the perimeter of the trapezoid.

FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 4
Algebra 2:
Simultaneous Equations

1.) a=32 b=29

2.) k= -6

3.) (5 , -1) or (6 , -65)

1.) Solve for a and b:

$$10a - 11b = 1$$

$$9a - 10b = -2$$

2.) What is the value of k such that the system

$$kc + 4d = -12$$

$$9c + kd = 18$$

has infinitely many solutions (c,d) ?

3.)_ Solve for the two possible ordered pairs (x,y):

$$x - \frac{1}{y+2} = 4$$

$$x(y+4) = 15$$

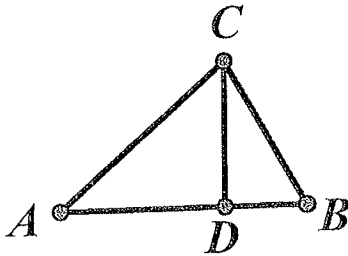
FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 5
Trig: Right Triangles

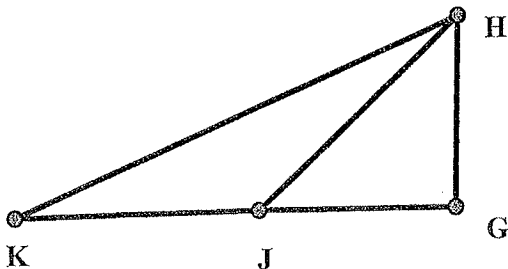
- 1.) ~~$a=32, b=29$~~ $\frac{9\sqrt{106}}{106}$
- 2.) ~~$k=6$~~ 12 feet
- 3.) ~~$(5, 11), (6, 1.5)$~~ 15 meters

1.) In right triangle XYZ, the right angle is at Y. $XY=5$ and $YZ=9$. What is the sine of angle X? Express your answer in simplest radical form.

2.) In right triangle ABC, the right angle is at C. An altitude from C intersects \overline{AB} at point D. If $\cos(A) = \frac{4}{5}$ and the area of $\triangle ABC$ is 150 square feet, what is the length of \overline{CD} in feet?



3.) Points G, J, and K are at the same horizontal level. An observer at point J looks at the top of a vertical tower \overline{GH} and finds that $\tan(\angle GJH) = 0.3$. The observer moves back 50 meters to point K and finds that $\tan(\angle GKH) = 0.15$. How tall is the tower?



FAIRFIELD COUNTY MATH LEAGUE (FCML) 2016-2017

Match 1 Round 6
Coordinate Geometry

1.) $y = -\frac{2}{7}x - \frac{29}{7}$

2.) $\sqrt{109}$

3.) $-10, -2$

1.) Find the equation of the line that is the perpendicular bisector of the segment connecting $(-2,4)$ and $(-6,-10)$. Express your answer in the form $y=mx+b$.

2.) Point A is in quadrant III, point B is in quadrant I, and point C is in quadrant II. \overline{AB} has slope $\frac{3}{2}$ and has length $3\sqrt{13}$. \overline{AC} has slope -3 and has length $4\sqrt{10}$. Find the length of \overline{BC} .

3) Find all values of k such that the line segment connecting $(-8,k)$ and $(k,-4)$ has length $2\sqrt{10}$.

FAIRFIELD COUNTY MATH LEAGUE 2016-17 Match 1 Team Round

- 1.) $\frac{\sqrt{2}-1}{2}$ _____ 4.) $(2, 3)$ _____
2.) 621 _____ 5.) $10, 0.4$ _____
3.) $7\sqrt{3} - 100$ _____ 6.) 45 _____

1.)_ The ratio of the 4 interior angles of kite ABCD is 4:7:6:7, where the 4 corresponds with angle A and the 6 corresponds with angle C. The diagonals intersect at E. Find the positive difference between $\sin(\angle BCE)$ and $\sin(\angle BAE)$. Give your answer as a single reduced fraction in simplest radical form.

2.) $x\%$ of y is z . $z\%$ of x is $36y$. $y\%$ of z is $\frac{x-60}{1000}$. Give the value of $x+y+z$ given that $x, y,$ and z are all positive.

3.) Ten years ago, Joe walked back a certain horizontal distance from the base of a tree and found that the cosine of the angle of elevation to the top of the tree was 0.6. The tree grew over time, so today, Joe walked back the same horizontal distance and found the cosine of the angle of the elevation was 0.5. What was the percent increase in the height of the tree? Give your answer in simplest radical form.

4.) The circumcenter of a triangle is the point where its perpendicular bisectors intersect. Give the coordinates of the circumcenter of the triangle with vertices $(5,7), (6,6),$ and $(2,-2)$

5.) Solve for c : $\frac{1}{c-4} + \frac{1}{c+14} = \frac{1}{c+2} + \frac{1}{c-2}$

6. The lines $x+3y=5$ and $3x-y=10$ contain two diagonals of a rhombus. Two of the vertices of the rhombus are $(-1,2)$ and $(2,-4)$. Find the area of the rhombus.