Class Plan:

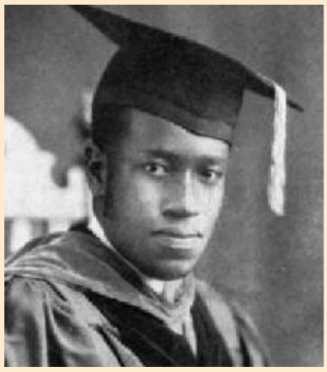
(3 Day week - no assignment sheet)

1. Mathematician Monday
2. Warm-up
3. Review Unit 2 Topics
   - Pythagorean Theorem
   - Classify Triangles
   - Distance Formula
   - Midpoint
   - Applications

Mathematician Monday!

Elbert Frank Cox

Elbert Frank Cox (December 5, 1895 – November 28, 1969) was an American mathematician who became the first black person in the world to receive a Ph.D. in mathematics.



https://en.wikipedia.org/wiki/Elbert_Frank_Cox

Mathematician Monday!

Elbert F. Cox was born and raised in a college town in a racially mixed neighborhood, but at segregated schools.

His father, a school principal, had graduated from Evansville College and had done graduate work at Indiana University. Close knit and highly religious, the Cox family had a respect for learning that reflected the father's educational career.

When young Elbert demonstrated unusual ability in high school mathematics and physics, he was directed toward Indiana University.

Mathematician Monday!

After he graduated in from Indiana University with his Bachelor's Degree in 1917, Cox joined the U.S Army to fight in World War I.

After he was discharged from the Army, he began his career as a high school math teacher.

Mathematician Monday!

In December 1921 he applied for admission to Cornell University, one of seven American universities with a doctoral program in mathematics.

One of his references wrote a positive letter followed by another letter anticipating difficulties for him because he was a colored man.[1]

Mathematician Monday!

Fox was awarded his PhD by Cornell in 1925, for his dissertation, **The polynomial solutions of the difference equation af(x+1) + bf(x) = [Phi](x).[2]**

He spent most of his life as a professor at Howard University in Washington, D.C.

Mathematician Monday!

During his life, Cox published two articles.

He expanded on the work Niels Nörlund had done on Euler polynomials as a solution to a particular difference equation[2].

Cox used generalised Euler polynomials and the generalised Boole summation formula to expand on the Boole summation formula.

He also studied a number of specialised polynomials as solutions for certain differential equations. In his other paper, published in 1947, he mathematically compared three systems of grading.[3]

Mathematician Monday!

The National Association of Mathematicians established the Cox-Talbot Address in his honor, which is annually delivered at the NAM's national meetings.

Each year NAM invites a mathematical scientist or educator who exemplifies the spirit of Cox and Talbot in both personal achievement and service to the mathematical community. The hour-long lecture takes place during the annual NAM Banquet as part of the Joint Mathematics Meetings.

The Elbert F. Cox Scholarship Fund, which is used to help black students pursue studies, is also named after him.

Warm-up: Find the ***other*** endpoint.

Show work algebraically and graphically.

Endpoint: (7, 6), midpoint: (1, 7)

(x, y) $(-5, 8)$

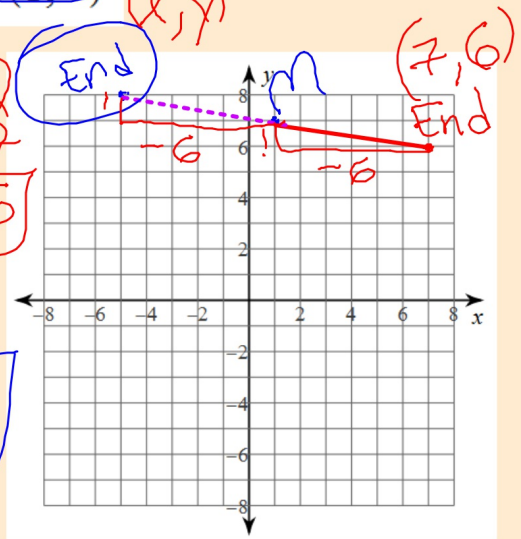
$\frac{x+7}{2} = 1 \quad (2)$ $x+7=2$

$-7 \quad -7$

$x = -5$

$\frac{y+6}{2} = 7 \quad (2)$

$y+6 = 14$ $y = 8$



Warm-up: Fine the ***other*** endpoint.

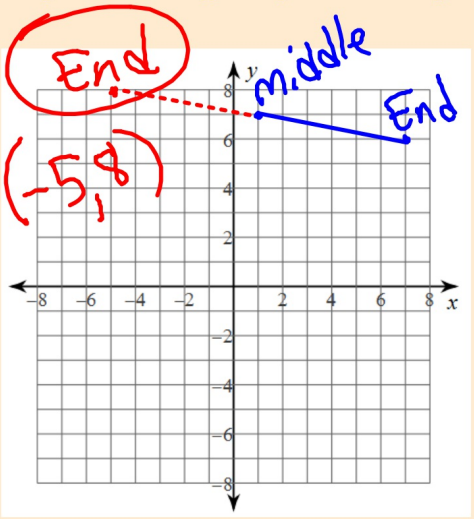
Show work algebraically and graphically.

Endpoint: $(7, 6)$, midpoint: $(1, 7)$

$\frac{x+7}{2}=1$ $\frac{y+6}{2}=7$

$x+7=2$ $y+6=14$

$x=-5$ $y=8$

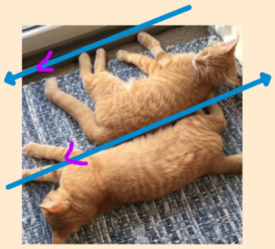


Unit 2: Coordinate Geometry

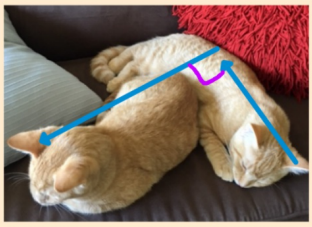
Review Day 2!

DO: Classify Triangles & Quadrilaterals on a graph
- use slopes & lengths!

Parallel: Equal slopes
Perpendicular: *opposite* and reciprocals



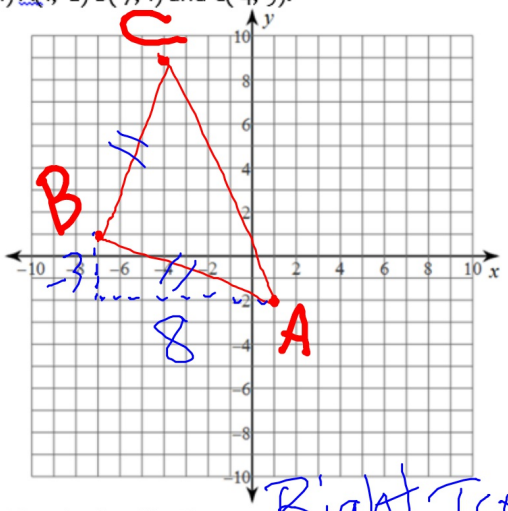
Parallel



Purrrrpendicular :)

Directions: Explain if the triangle is isosceles, equilateral, or scalene using the **lengths** of the sides. Then use Pythagorean Theorem to determine if the triangle is *right, acute, or obtuse.*

1) A(1, -2) B(-7, 1) and C(-4, 9).



Triangle classifications: Right Isos

Find slopes of each side:

BA: $-3/8$

BC:

CA:

Find lengths of each side:

BA:

BC:

CA:

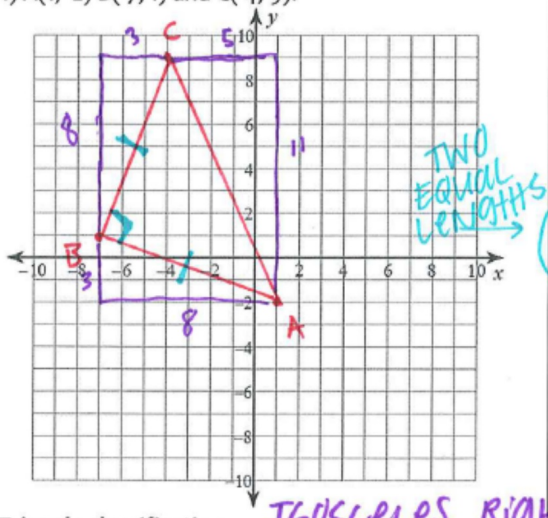
Pythagorean Equation Work

$(\sqrt{73})^2 + (\sqrt{73})^2 = (\sqrt{146})^2$

$73 + 73 = ? \; 146$

Solution

1) A(1, -2) B(-7, 1) and C(-4, 9).



TWO EQUAL LENGTHS

Find slopes of each side:

BC: $\frac{up\ 8}{rt\ 3} = \frac{8}{3}$

BA: $\frac{dn\ 3}{rt\ 8} = \frac{-3}{8}$

CA: $\frac{dn\ 11}{rt\ 5} = \frac{-11}{5}$

PERPENDICULAR LINES (OPPOSITE RECIPROCAL SLOPES)

Find lengths of each side:

BA: $\sqrt{3^2 + 8^2} = \sqrt{9+64} = \sqrt{73}$

BC: $\sqrt{3^2 + 8^2} = \sqrt{9+64} = \sqrt{73}$

CA: $\sqrt{5^2+11^2} = \sqrt{25+121} = \sqrt{146}$

Pythagorean Equation Work

$(\sqrt{73})^2 + (\sqrt{73})^2 \square (\sqrt{146})^2$

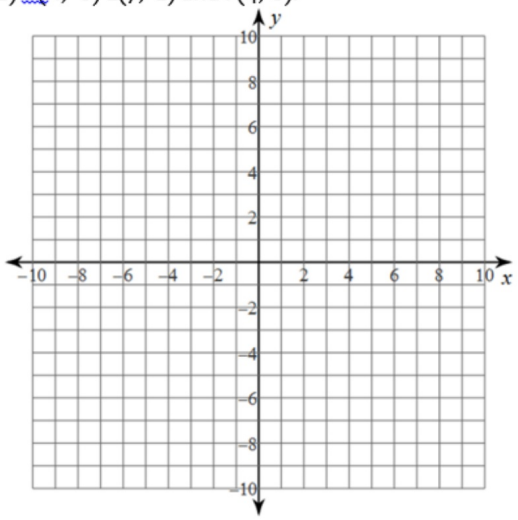
$73 + 73 \square 146$

$146 = 146$

Triangle classifications: ISOSCELES RIGHT TRIANGLE

Directions: Explain if the triangle is isosceles, equilateral, or scalene using the **lengths** of the sides. Then use Pythagorean Theorem to determine if the triangle is *right*, *acute*, or *obtuse*.

2) D(-1, -6) E(7, -2) and F(4,-6).



Triangle classifications: _____

Find slopes of each side:

DE:

DF:

FE:

Find lengths of each side:

DE:

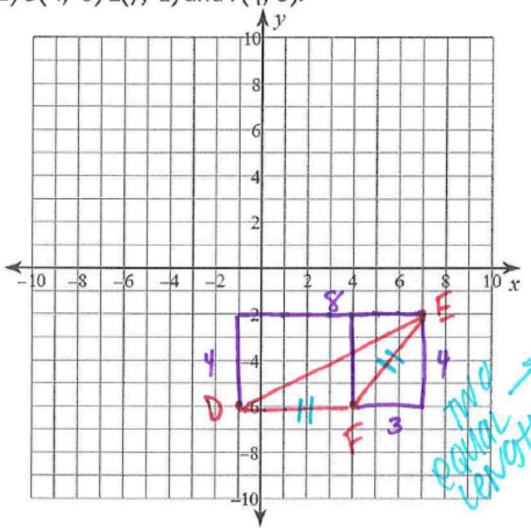
DF:

FE:

Pythagorean Equation Work

Solution

2) D(-1, -6) E(7, -2) and F(4,-6).



Find slopes of each side:

DE: $\frac{\text{UP } 4}{\text{Right } 8} = \frac{4}{8} = \frac{1}{2}$

DF: $\frac{0}{5} = 0$

FE: $\frac{\text{UP } 4}{\text{Right } 3} = \frac{4}{3}$

Find lengths of each side:

DE: $\sqrt{4^2+8^2} = \sqrt{16+64} = \sqrt{80}$

DF: 5 (count! ☺)

FE: $\sqrt{3^2+4^2} = \sqrt{9+16} = \sqrt{25} = 5$

two equal lengths

Pythagorean Equation Work

$5^2 + 5^2 \square (\sqrt{80})^2$

$25+25 \square 80$

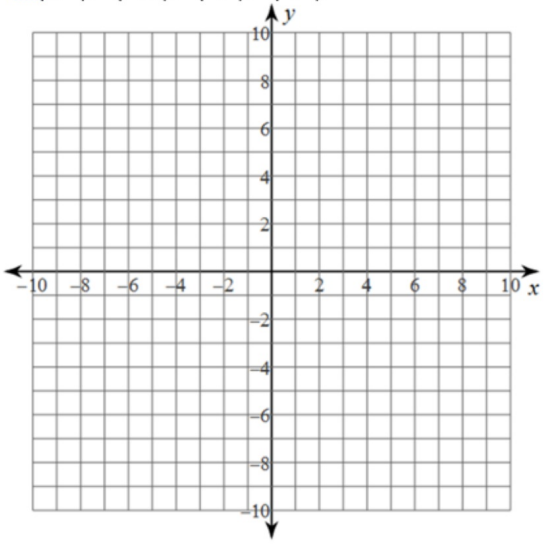
$50 < 80$

$a^2+b^2 < c^2$

Triangle classifications: ISOSCELES OBTUSE TRIANGLE

Directions: Classify the quadrilateral using **lengths AND slopes** of the sides.

1. W(5, 6), E(-2, 5), S(-1, 1), T(6, 2)



Find slopes of each side:

EW:

ES:

ST:

WT:

Find lengths of each side:

EW =

ES =

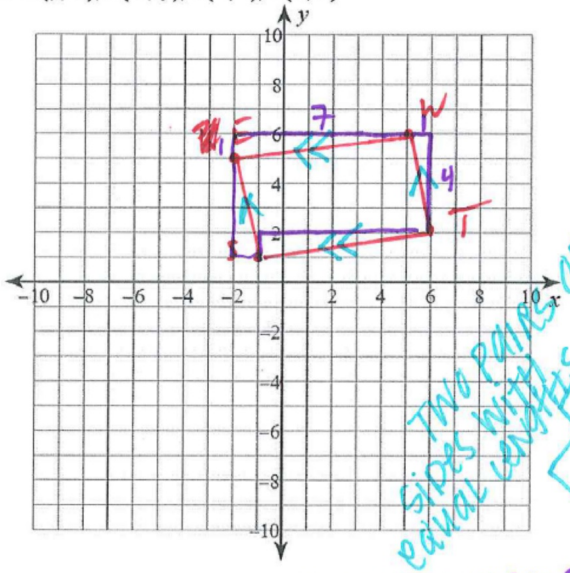
ST =

WT =

Quadrilateral classification: _____

Solution

1. W(5, 6), E(-2, 5), S(-1, 1), T(6, 2)



Find slopes of each side:

EW: $\frac{\text{UP 1}}{\text{Right 7}} = \frac{1}{7}$

ES: $\frac{\text{DOWN 4}}{\text{Right 1}} = \frac{-4}{1}$

ST: $\frac{\text{UP 1}}{\text{Right 7}} = \frac{1}{7}$

WT: $\frac{\text{UP 4}}{\text{LEFT 1}} = \frac{-4}{1}$

TWO PAIRS OF PARALLEL SIDES!

Find lengths of each side:

EW = $\sqrt{1^2+7^2} = \sqrt{1+49} = \sqrt{50}$

ES = $\sqrt{4^2+1^2} = \sqrt{16+1} = \sqrt{17}$

ST = $\sqrt{1^2+7^2} = \sqrt{1+49} = \sqrt{50}$

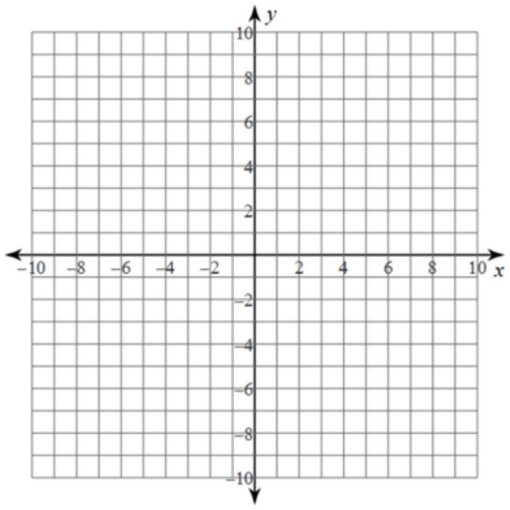
WT = $\sqrt{4^2+1^2} = \sqrt{16+1} = \sqrt{17}$

TWO PAIRS OF SIDES WITH EQUAL LENGTHS

Quadrilateral classification: Parallelogram

Directions: Classify the quadrilateral using **lengths AND slopes** of the sides.

2. L(-3, 8), A(-7, 3), K(-2, -1), E(2, 4)



Quadrilateral classification: _____

Find slopes of each side:

AL:

AK:

LE:

KE:

Find lengths of each side:

AL =

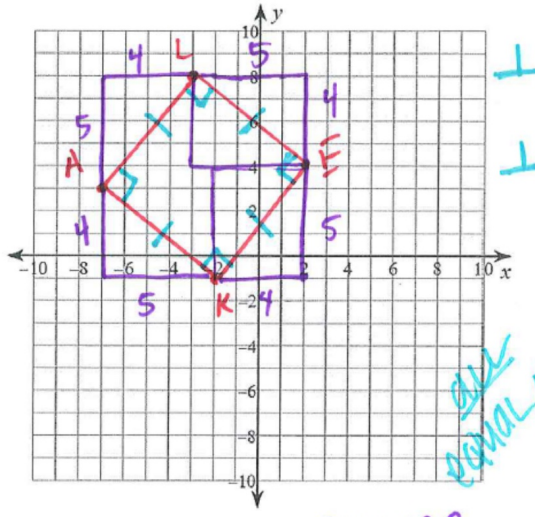
AK =

LE =

KE =

Solution

2. L(-3, 8), A(-7, 3), K(-2, -1), E(2, 4)



$\frac{5}{4}$ & $-\frac{4}{5}$ opposite reciprocals

Find slopes of each side:

AL: $\frac{\text{UP } 5}{\text{Right } 4} = \frac{5}{4}$

AK: $\frac{\text{DOWN } 4}{\text{Right } 5} = -\frac{4}{5}$

LE: $\frac{\text{DOWN } 4}{\text{Right } 5} = -\frac{4}{5}$

KE: $\frac{\text{UP } 5}{\text{Right } 4} = \frac{5}{4}$

$\perp$ $\perp$

TWO PAIRS OF PARALLEL SIDES!

Find lengths of each side:

AL = $\sqrt{5^2+4^2} = \sqrt{25+16} = \sqrt{41}$

AK = $\sqrt{5^2+4^2} = \sqrt{41}$

LE = $\sqrt{5^2+4^2} = \sqrt{41}$

KE = $\sqrt{5^2+4^2} = \sqrt{41}$

ALL EQUAL

Quadrilateral classification: SQUARE

Exercises...

Study for Unit 2 Test Tomorrow!

After school help:
Ms. Berg's room W125

Look over exemplars!