4) The distance formula is an application to a formula originally developed by…

A) Fermat
B) Pythagoras
C) Euclid
D) Archimedes
E) Yff

_____

5) Which statement has the same true value as the following statement?

"It only snows in New York in late July."

A) The triangles formed by the centroid have equal perimeters
B) When segments are formed by midpoints, a segment is half of its parallel base.
C) The incenter is always located within the triangle.
D) The circumcirle intersects with each vertex of a triangle.
E) The orthocenter is on the Euler Line.

_____

6) When writing the equation of a line, the final answer is written in the form:

A) Y_2-Y_1/X_2-X_1
B) $X=-b/2a$
C) $Y=K_x$
D) $Y=mX+b$
E) $X=ax^2+bx+c$

_____

7) Which line is perpendicular to y-9-5x=0

A) Y=5x+9
B) Y=5x-9
C) Y=-5x+9
D) Y=-(1/5)x+9
E) Y=-(1/5)x-9

_____

8) Let:
P: A dog is an animal, if an octopus is not a cat.
Q: An octopus is a cat.
R: A cat is a dog, if a dog is an animal.
S: Both cats and dogs are animals.

Which statements need to be false for this statement to be true?

A dog is an animal or a cat is not an animal.

A) P must be false
B) Q must be false
C) R must be false
D) S must be false
E) Q and S must be false

_____

9) Points A, B, and C, were collinear. However, when the distances between points AB, BC and AC are used to attempt to make a triangle, a triangle cannot be created. Which is a valid conjecture about the three line segments?

A) The segments are not arranged properly
B) Segment AC is too short
C) To make a triangle, Point D must be created
D) A triangle is created, but the lines do not overlap
E) None of the above

_____

10) The altitude of a triangle…

A) Intersects the midpoint of the base and a vertex
B) Creates a right angle with the base
C) Is always shorter than the base it intersects
D) Intersects the midpoint of the base and the opposite vertex
E) Is in a different location than the median from the same vertex in an equilateral triangle

_____

Part 2: Short Answer

1) Seven geometry students were in a three round proof competition to see who could correctly answer a proof the fastest.

Here are the results of round one:

- Trudy completed the prove line a mere 10 seconds after Toby, with nobody finishing between them.
- Tom finished right between Tab and Tracy.
- Tim was the fastest, and won the competition.
- Tom completed the proof right after the boy who finished second.
- Toby saw four people finish before him.
- Tab was not the 4^{th} person to finish.
- Sam did not finish

In round two, only the top three continued.

- Tim was eliminated because the judges saw him open his math journal to look up "detachment".
- The second and third place students moved on to round 3 because Tim was eliminated.

In and after round three…

- out of the two remaining candidates, the one who came in third place in round 2 two won the competition.
- In the after party, someone took a picture of a boy holding the 1^{st} place trophy.
- The boy who was photographed was truly the winner.
- That boy was not Sam.

Who was in the picture?

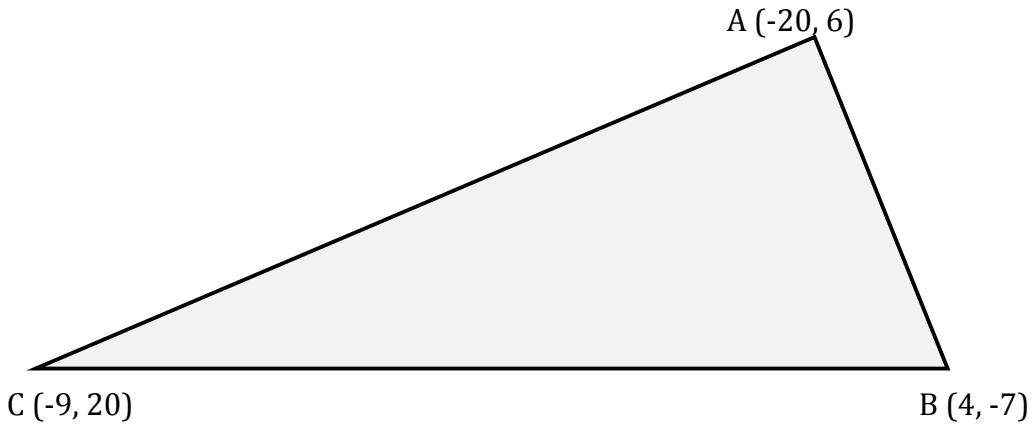
2) *A man walks down a icy street as he goes to the grocery store. If he slips, then he will always go to the hospital. If he does not go to the hospital, then will he slip?*

A) Prove the outcomes of this statement based on whether the man slips.

C) State the name of the law featured in this sentence.

C) Based on your proof, explain the relationship between the law and the truth value of the statement.

3) Triangle ABC is a two dimensional triangle graphed on an X and Y axis.



A) What are the coordinates of the centroid?

B) What is the area of the triangle?

Part 3: Proofs

1) Logic Proof

Law of Detachment	If P then Q, and P is true then Q is true
Law of the Contrapositive	If p → q is true then ~O→ ~p is true
Law of Modus Tollens	p → q and ~q then ~p
Chain Rule (Law of the Syllogism)	if p→q and q→z then p → r
Law of Disjunctive Inference	p v q and ~q then p
De Morgan's Laws	~(p v q) is ~q v ~p

Given: ~(p⋀~q)
p
~s→~h

Let p= It is snowing
Let h= I wear a jacket
Let s= It is winter

Is it winter?

2) Triangle Proof

Choose and complete **1** of the **2** triangle proofs:

Given:

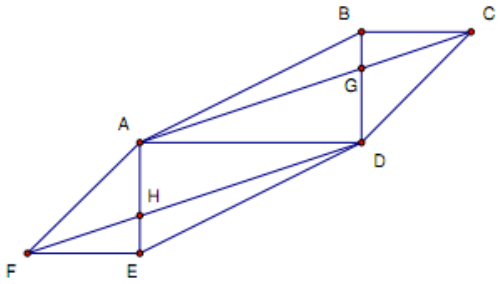
$\angle ABC \cong \angle DEF$

$\overline{AB} \,//\, \overline{DE}$

$\overline{AB} \cong \overline{DE}$

Prove:

$\angle DBC \cong \angle AEF$



Given:

$\overline{MD} \perp \overline{AB}$

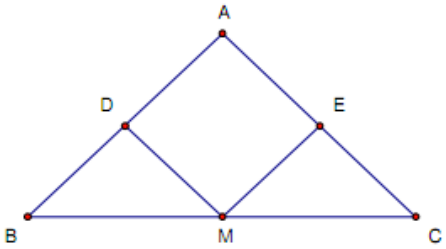
$\overline{ME} \perp \overline{AC}$

M is the midpoint of $\overline{BC}$

$\overline{DB} \cong \overline{EM}$

Prove:

$\Delta DBM \cong \Delta EMC$

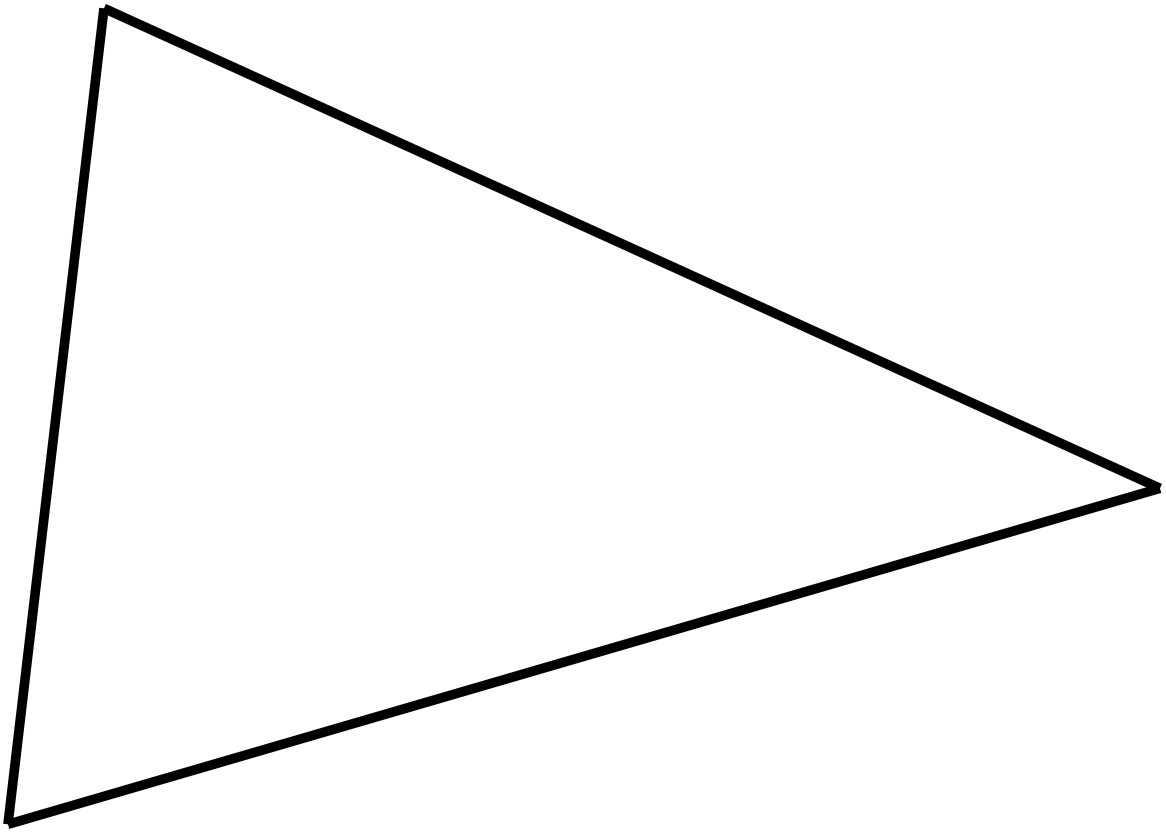


Proofs From: http://www.westirondequoit.org/ihs/Math/Tytler/Math_Home_Page/Math_2A/triangle_proof/triangle_proof_index.htm

Statements	Reasons

Part 4: Constructions

Construct the largest possible equilateral triangle to be located within the largest possible circle in triangle below. Then, the longest leg of the equilateral triangle, create a square, where a vertex intersects with line AB on a 45-degree angle. Darken your equilateral triangle and square.



A B