

*H.M.D.G.*

Directions: Complete each problem in the space provided.

1. A triangle has sides of length 22 cm and 47 cm. Which of the following lengths could **NOT** be the length of the third side?  
 [A] 25                      [B] 37                      [C] 49                      [D] 53                      [E] 68

2. Given the following conditional statement, which is true:

“If two lines are parallel, then they do not intersect”

- I. The converse is true.  
 II. The inverse is true.  
 III. The statement can be written as biconditional.

- [A] I                      [B] I and II                      [C] II and III                      [D] I, II, and III                      [E] none

3. Which of the following is a line parallel to the line  $5x + 3y = 15$ ?

- [A]  $y = -5x + 16$       [B]  $y = \frac{5}{3}x + 16$       [C]  $y = \frac{3}{5}x + 16$       [D]  $y = -\frac{3}{5}x + 16$       [E]  $y = -\frac{5}{3}x + 16$

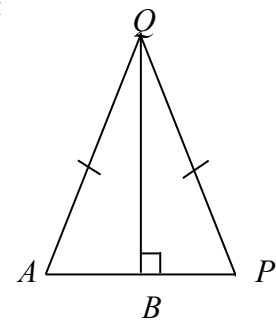
4. Which of the following statements are true?

- I. The medians of a triangle intersect at the orthocenter.  
 II. The midsegment of a triangle is parallel to one side of the triangle.  
 III. The angle bisectors of a triangle intersect at the incenter.

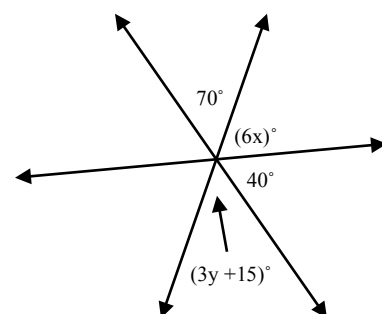
- [A] I                      [B] I and II                      [C] II and III                      [D] I, II, and III                      [E] none

5. Which of the following **could** be used to prove  $\triangle AQB \cong \triangle PQB$  (mark all that apply):

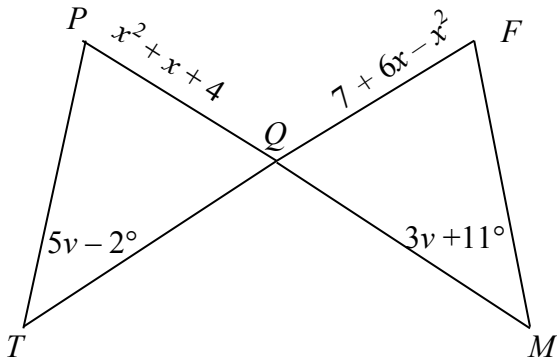
- [A] SSS  
 [B] SAS  
 [C] HL  
 [D] AAS  
 [E] ASA



6. Find the value of the variables. 6 points



7. Given that  $\triangle PQT \cong \triangle FQM$ , find the values of  $u$  and  $v$ . Show all work and state the reason(s) why you can set up the equations the way you did. Then find  $m\angle M$  and  $QF$ .



8. Given the true statement: “If an animal is a mouse, then it has a tail”, write then converse, inverse, and contrapositive. Circle the one that **must** be true, and provide counterexamples for the other statements to demonstrate why they may be false.

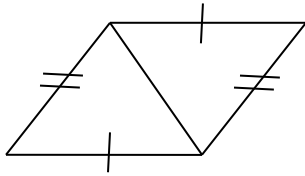
Converse: If it has a tail, then it is a mouse. False, a dog has a tail and is not a mouse.

Inverse: If an animal is not a mouse, it does not have a tail. False, a cat is not a mouse, but it has a tail.

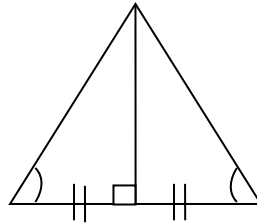
Contrapositive: If an animal does not have a tail, then it is not a mouse

9. For each of the problems below, determine whether or not you can prove the triangles congruent. If you can, which congruency statement would you use to prove congruency. Make sure you mark the diagram to demonstrate which parts you are using in your congruency statement.

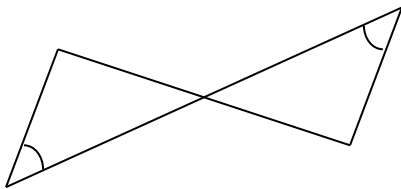
a.



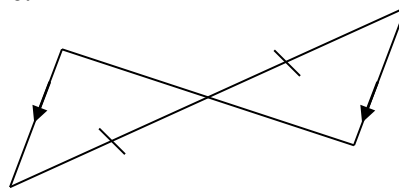
d.



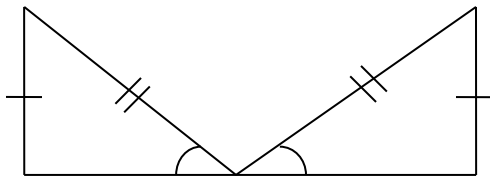
b.



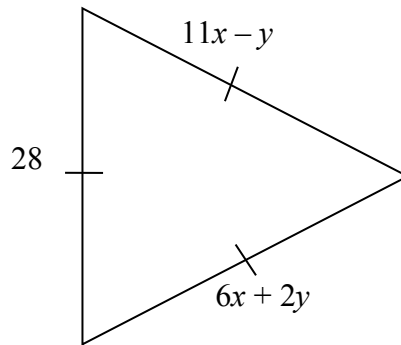
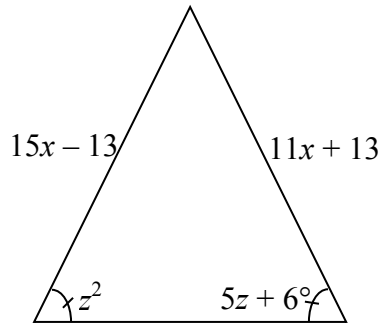
e.



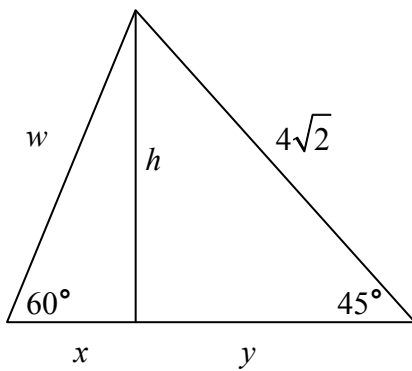
c.



10. In the diagrams below, solve for  $x$ ,  $y$  and  $z$ .



11. Given that  $h$  is the altitude of the triangle below, find  $w$ ,  $x$ ,  $y$ , and  $h$

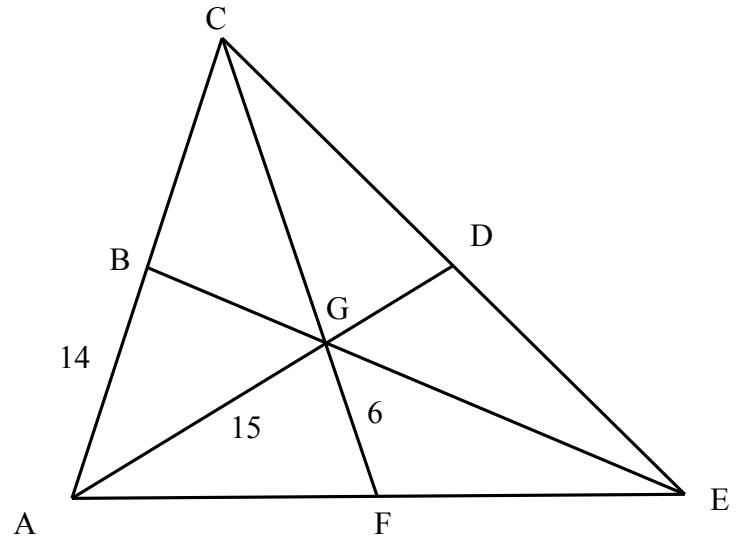


12. Given that  $\overline{CF}, \overline{DA}, \overline{BE}$  are all medians of  $\triangle ACE$  find the following values.

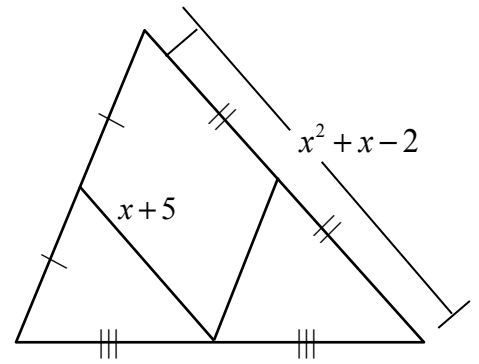
a) CB

b) CG

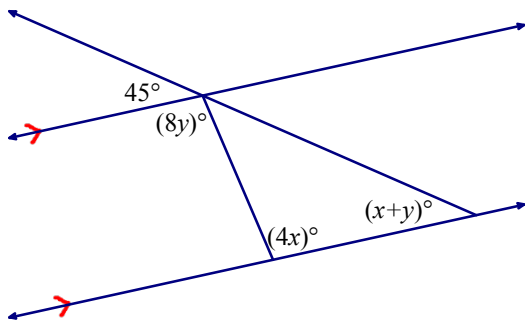
c) AD



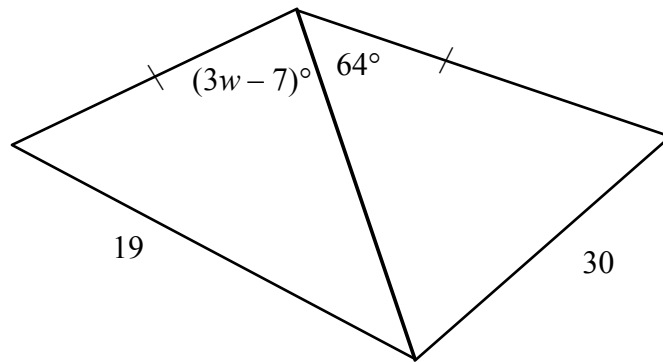
13. Solve for  $x$



14. Solve for  $x$  and  $y$



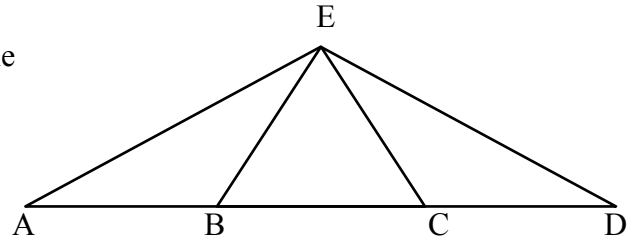
15. Find the range of values for  $w$



16. Given that  $F$  is a point on  $\overline{AI}$  that is not the midpoint,  $AF = y^2 + 2y$ ,  $FI = y + 11$ , and  $AI = 8 - y$ , sketch the situation, then find all possible values for  $y$ ,  $AF$ ,  $FI$ , and  $AI$  assuming that all measures are in inches. Name the postulate that allows you to set up this problem.

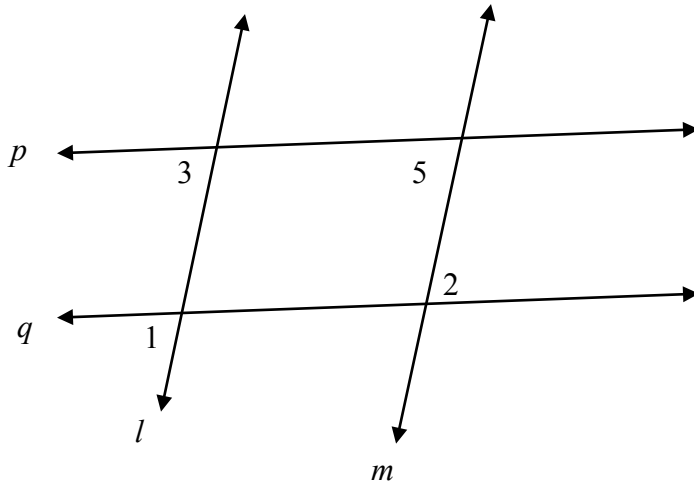
17. **Given:**  $\triangle BEC$  is an equilateral (and equiangular) triangle  
 $\overline{AB} \cong \overline{CD}$

**Prove:**  $\triangle AEC \cong \triangle DEB$



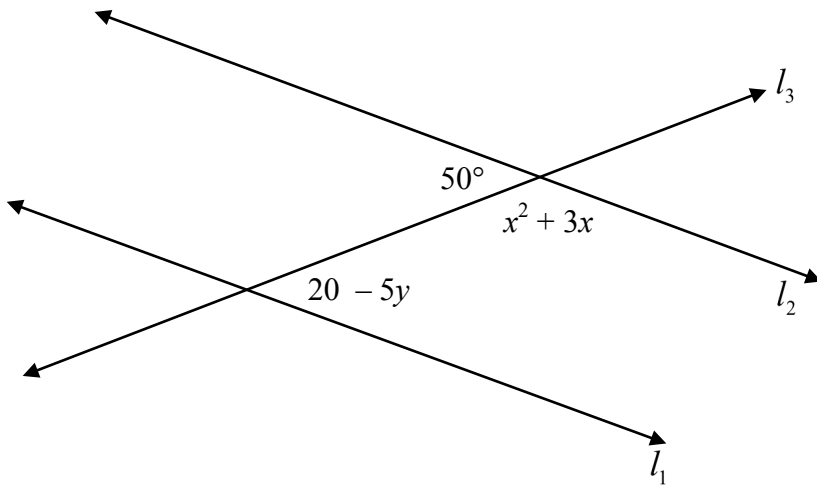
18. **Given:**  $\angle 1 \cong \angle 2$  and  $\angle 1 \cong \angle 5$

**Prove:**  $p \parallel q$



19. Find the equation of the line passing through the points  $(-3,-5)$  and  $(4,8)$ . Then find the equation of the lines parallel and perpendicular to that line that passes through the point  $(-2,1)$ .

20. Find all values of  $x$  and  $y$  that will make  $l_1 \parallel l_2$ .





21. List the sides in order from greatest length to smallest length. Note that the figure is not drawn to scale.  
(10 points)

