

# Adv. Geometry Rev. ch. 5

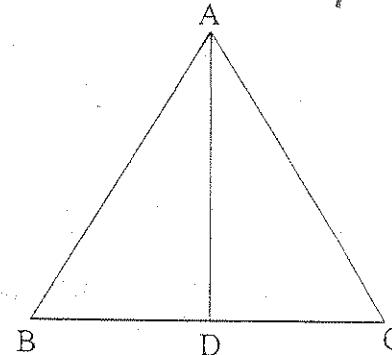
Key

1. Given:  $\triangle ABC$  is an Isosceles triangle with vertex A

$\overline{AD}$  is the median to base  $\overline{BC}$

Prove:  $\triangle ABD \cong \triangle ACD$

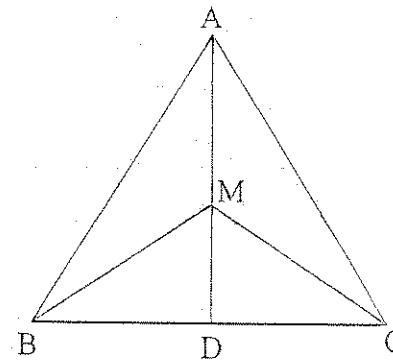
| Statement  | Reason                          |
|--|---------------------------------|
| ① $\triangle ABC$ is Isosceles $\triangle$<br>w/ vertex A; $\overline{AD}$ is median | ① Given                         |
| ② $\overline{AB} \cong \overline{AC}$  | ② Def. of Isosceles $\triangle$ |
| ③ $\overline{AD} \cong \overline{AD}$  | ③ Reflexive                     |
| ④ $\overline{BD} \cong \overline{CD}$  | ④ Def. of Median                |
| ⑤ $\triangle ABD \cong \triangle ACD$  | ⑤ SSS                           |



2. Given:  $\overline{AD}$  is a perpendicular bisector of  $\overline{BC}$

Prove:  $\angle ABM \cong \angle ACM$

| $\overline{AD}$ is $\perp$ bisector of $\overline{BC}$                      | R                          |
|---|----------------------------|
| ① $\overline{AD}$ is $\perp$ bisector of $\overline{BC}$                    | ① Given                    |
| ② $\overline{AB} \cong \overline{AC}$ ; $\overline{MB} \cong \overline{MC}$ | ② Def. of $\perp$ bisector |
| ③ $\overline{AM} \cong \overline{AM}$                                       | ③ Reflexive                |
| ④ $\triangle ABM \cong \triangle ACM$                                       | ④ SSS                      |
| ⑤ $\angle ABM \cong \angle ACM$   | ⑤ CPCTC                    |



4. Graph  $\triangle ABC$  with vertices  $A(0, k)$ ,  $B(h, 0)$ , and  $C(-h, 0)$ .

Find the coordinates of

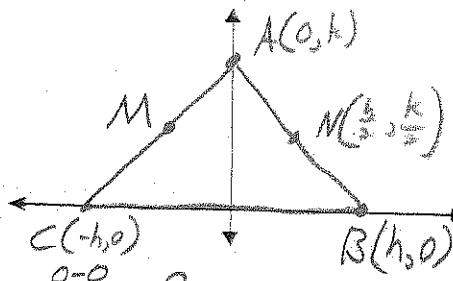
$$\text{a. the midpoint } M \text{ of } \overline{CA} = \left( \frac{-h+0}{2}, \frac{k+0}{2} \right) = \left( \frac{-h}{2}, \frac{k}{2} \right) M$$

$$\text{b. the midpoint } N \text{ of } \overline{BA} = \left( \frac{0+h}{2}, \frac{k+0}{2} \right) = \left( \frac{h}{2}, \frac{k}{2} \right) N$$

Find the

$$\text{c. slope of } \overline{MN} = \frac{\frac{k}{2} - \frac{k}{2}}{\frac{h}{2} - \frac{-h}{2}} = \frac{0}{h} = 0$$

$$\text{d. slope of } \overline{CB} = \frac{0-0}{-h-h} = \frac{0}{-2h} = 0$$



- e. What type of special triangle segment is  $\overline{MN}$ . State whether or not  $\overline{MN} \parallel \overline{CB}$  and Explain.

Midsegment

$$\overline{MN} \parallel \overline{CB} \Rightarrow \text{slopes} \parallel$$

5. Point D is the incenter of  $\triangle ABC$ . Find the value of x.

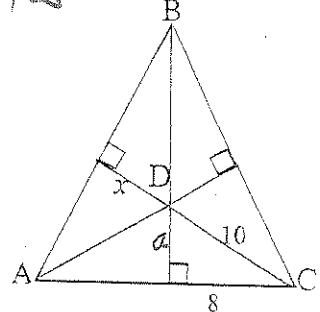
$$a^2 + 8^2 = 10^2$$

$$a^2 = 36$$

$$a = 6$$

$$x = a$$

$$\boxed{x = 6}$$



6. Is it possible to construct a triangle with the following side lengths? If not explain.

34, 42, 8

NO

$$8 + 34 > 42$$

7. Describe the possible lengths of the third side of the triangle given the lengths of the other two sides.

16 feet, 20 feet

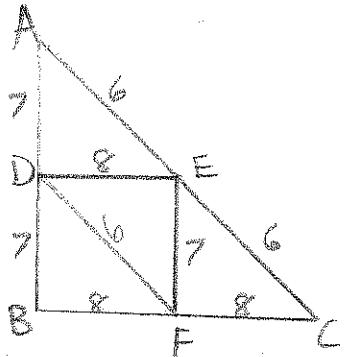
$$x + 16 > 20$$

$$x > 4$$

$$16 + 20 > x$$

$$36 > x$$

$$4 < x < 36$$



D, E, and F are midpoints on  $\triangle ABC$ . Use the drawing for #849.

$$\textcircled{8} \quad AE = 6x + 12$$

$$DF = 3.7x + 51 = 13.739$$

$$AC = ? \quad \textcircled{227.478}$$

$$AE = DF$$

$$6x + 12 = 3.7x + 51$$

$$2.3x = 39$$

$$x = 16.957$$

$$\textcircled{9} \quad AE = 6, DE = 8, EF = 7$$

$$\text{Perimeter of } \triangle ABC = ? \quad \textcircled{42}$$

$$\text{Perimeter of } \triangle DEF = ? \quad \textcircled{21}$$

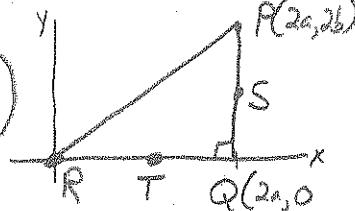
- \textcircled{10} Graph  $\triangle PQR$ , with vertices  $P(2a, 2b)$ ,  $Q(2a, 0)$  and  $R(0, 0)$ . Find the coordinates of the midpoints S of  $\overline{PQ}$  and T of  $\overline{QR}$ . Show  $\overline{ST} \parallel \overline{PR}$ .

$$S\left(\frac{2a+2a}{2}, \frac{2b+0}{2}\right) = S(2a, b)$$

$$T\left(\frac{2a+0}{2}, \frac{0+0}{2}\right) = T(a, 0)$$

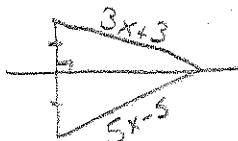
$$m_{ST} = \frac{b-0}{2a-a} = \frac{b}{a}$$

$$m_{PR} = \frac{2b-0}{2a-0} = \frac{2b}{2a} = \frac{b}{a} \quad \text{slopes } \cong$$



For Questions 11-16, solve for the variables.

\textcircled{11}

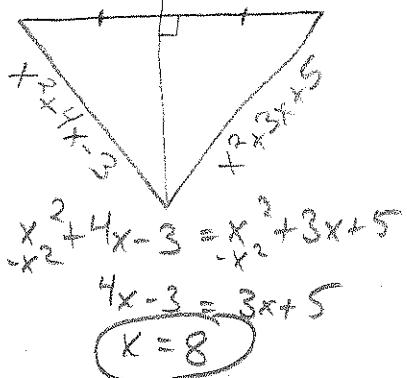


$$5x - 5 = 3x + 3$$

$$2x = 8$$

$$x = 4$$

\textcircled{12}

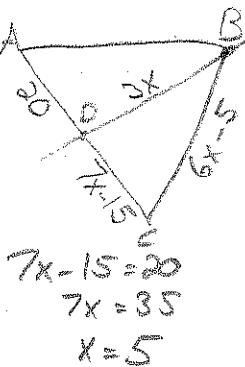


$$x^2 + 4x - 3 = x^2 + 3x + 5$$

$$4x - 3 = 3x + 5$$

$$k = 8$$

\textcircled{13}



$$7x - 15 = 20$$

$$7x = 35$$

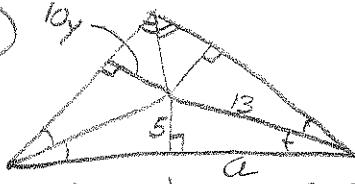
$$x = 5$$

$\overline{BD}$  is the perpendicular bisector of  $\overline{AC}$ .

$$\textcircled{13} \quad AB = 25$$

$$BD = 15$$

\textcircled{14}



$$5^2 + a^2 = 13^2$$

$$a^2 = 144$$

$$a = 12$$

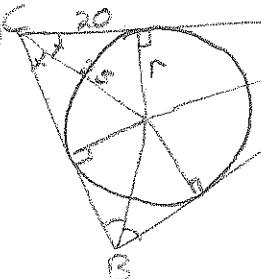
$$x = \text{Can't solve for}$$

$$y = \frac{1}{2}$$

$$10y = 5$$

$$y = \frac{1}{2}$$

\textcircled{15}

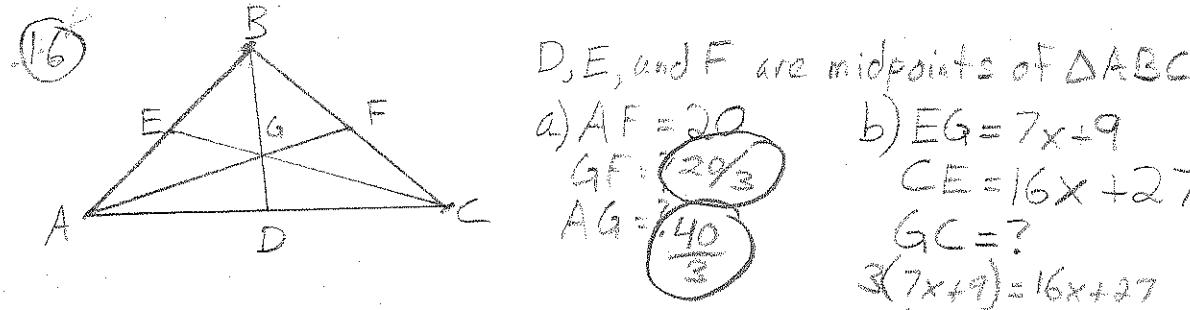


$$r^2 + 20^2 = 25^2$$

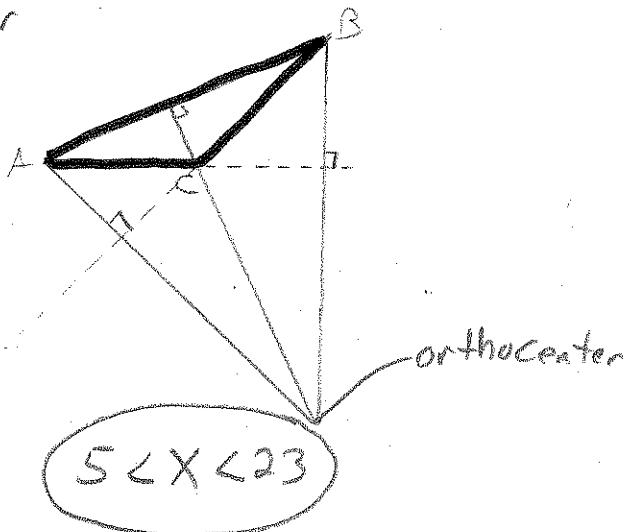
$$r = 15$$

$$d = 30$$

What is the diameter of the largest circle that can be drawn inside  $\triangle ABC$ ?



- ⑰ Use a straight edge to find the orthocenter of  $\triangle ABC$
- ↓  
altitudes



- ⑱ Describe the possible lengths of the third side of a triangle with the other two sides of 9 & 14.
- X is smallest side      X is largest side

$$x + 9 > 14$$

$$x > 5$$

$$9 + 14 > x$$

$$23 > x$$

- ⑲ If  $m\angle A < m\angle B < m\angle C$ , what are the possible values of  $x$ ?

$$x + 11 < 2x + 10 < 5x - 9$$

$$x + 11 < 2x + 10$$

$$1 < x$$

$$2x + 10 < 5x - 9$$

$$19 < 3x$$

$$\frac{19}{3} < x$$

$$x + 11 + 2x + 10 > 5x - 9$$

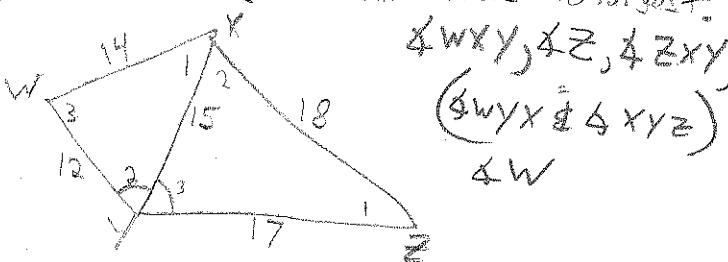
$$3x + 21 > 5x - 9$$

$$30 > 2x$$

$$15 > x$$

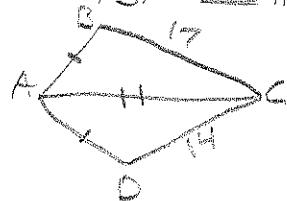
$$\frac{19}{3} < x < 15$$

- ⑳ List the angles from smallest to largest.



㉑ Complete with  $<$ ,  $>$  or  $=$ .

$$m\angle BAC \geq m\angle DAC$$



- ㉒ A market is the same distance from your house, the movie theater and the beach. Locate the market. Look for Circumcenter  
Ignore  $\perp$  at house

