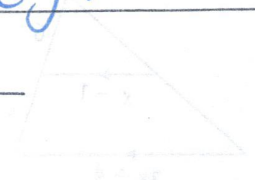


Triangles Unit Review

Secondary Math 2 Honors

Name: KEY!

Class: _____



Write the ratio of the first measurement to the second measurement.

- 1) height of car: 4 ft 8 in. \rightarrow 56 in.
height of toy car: 3 in.

$$\boxed{56:3}$$

- 2) There are 238 juniors at a high school. The ratio of girls to boys in the junior class is 3 : 4. How many juniors are girls? How many are boys?

$$\begin{aligned} 3x + 4x &= 238 \\ 7x &= 238 \\ x &= 34 \end{aligned}$$

$$\begin{aligned} G: 3x &= 102 \\ B: 4x &= 136 \end{aligned}$$

Solve each proportion.

3) $\frac{3}{5} = \frac{x}{25}$

$$\begin{aligned} 75 &= 5x \\ \boxed{x} &= \boxed{15} \end{aligned}$$

4) $\frac{8}{2y-3} = \frac{6}{y+4}$

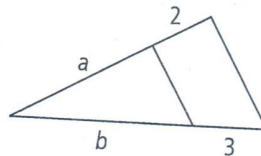
$$\begin{aligned} 8y + 32 &= 12y - 18 \\ -8y + 18 &\quad -8y + 18 \\ \hline 50 &= 4y \\ \frac{50}{4} &= \frac{4y}{4} \end{aligned}$$

$$\boxed{y = 12.5}$$

- 5) In the diagram, $\frac{a}{b} = \frac{2}{3}$. Complete each statement. Justify your answer.

$$\frac{b}{a} = \frac{\boxed{3}}{\boxed{2}}$$

(b) $\frac{\boxed{a}}{\boxed{2}} = \frac{b}{3}$



Explain why the triangles are similar. Then find the distance represented by x.

7)

$AA \sim$

$$\frac{50}{80} = \frac{30}{x}$$

$$50x = 2400$$

$$\boxed{x = 48 \text{ ft}}$$

8)

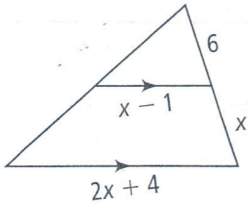
$SAS \sim$

$$\frac{6}{x} = \frac{4.5}{12}$$

$$72 = 4.5x$$

$$\boxed{x = 16 \text{ ft}}$$

9)



$$\frac{x-1}{2x+4} = \frac{6}{x+6}$$

$$(x-1)(x+6) = 12x+24$$

$$\begin{array}{r} x^2 + 5x - 6 = 12x + 24 \\ -12x - 24 \quad -12x - 24 \\ \hline \end{array}$$

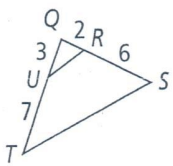
$$x^2 - 7x - 30 = 0$$

$$(x-10)(x+3) = 0$$

$$\boxed{x=10, \cancel{x=-3}}$$

Determine whether the triangles are similar. If so, write a similarity statement and name the postulate or theorem you used. If not, explain.

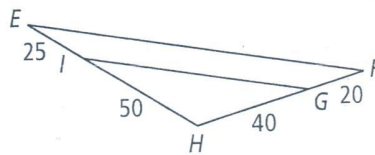
10)



$$\frac{3}{7} = \frac{2}{6}$$

$$\frac{3}{7} \neq \frac{1}{3} \quad \therefore \text{No!}$$

11)

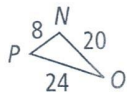
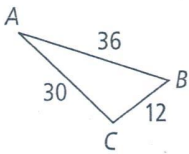


$$\frac{25}{50} = \frac{20}{40}$$

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

$$\boxed{\therefore \text{yes}}$$

12)



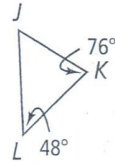
$$\boxed{\text{SSS} \sim \therefore \text{yes}}$$

$$\frac{36}{24} = \frac{30}{20} = \frac{12}{8}$$

$$\frac{3}{2} = \frac{3}{2} = \frac{3}{2} \checkmark$$

Solve for x.

13)



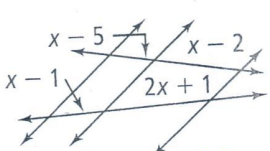
$$\angle J = 180 - (76 + 48)$$

$$\angle J = 56^\circ$$

$$\text{if } \sim \angle J \text{ should} = 63^\circ$$

$$\boxed{\therefore \text{No!}}$$

14)



$$\frac{x-5}{x-1} = \frac{x-2}{2x+1}$$

$$(2x+1)(x-5) = (x-1)(x-2)$$

$$2x^2 - 9x - 5 = x^2 - 3x + 2$$

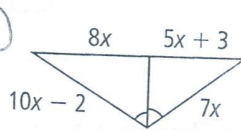
$$-x^2 + 3x - 2$$

$$x^2 - 6x - 7 = 0$$

$$(x-7)(x+1) = 0$$

$$\boxed{x=7, \cancel{x=-1}}$$

15)



$$\frac{8x}{10x-2} = \frac{5x+3}{7x}$$

$$56x^2 = (10x-2)(5x+3)$$

$$56x^2 = 50x^2 + 20x - 6$$

$$6x^2 - 20x + 6 = 0$$

$$2(3x^2 - 10x + 3) = 0$$

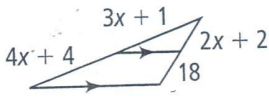
$$2(x-3)(3x-1) = 0$$

$$2[3x^2 - 9x - x + 3] = 0$$

$$\boxed{x=3, \frac{1}{3}}$$

$$2[3x(x-3) - 1(x-3)] = 0$$

16)



$$\frac{3x+1}{4x+4} = \frac{2x+2}{18}$$

$$54x+18 = (2x+2)(4x+4)$$

$$54x+18 = 8x^2+16x+8$$

$$0 = 8x^2 - 38x - 10$$

$$0 = 2(4x^2 - 19x - 5)$$

$$0 = 2[4x^2 - 20x + x - 5]$$

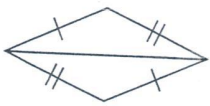
$$0 = 2[4x(x-5) + 1(x-5)]$$

$$0 = 2(x-5)(4x+1)$$

$$x=5$$

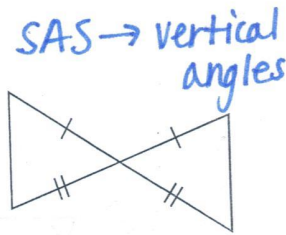
Would you use SSS or SAS to prove these triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write *not enough information*. Explain your answer.

17)



SSS → reflexive

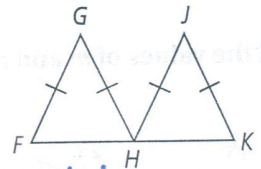
18)



SAS → vertical angles

19)

Not enough info



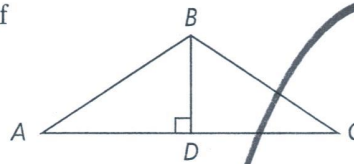
Must know:
 $\angle G \cong \angle J$ or
 $\overline{FH} \cong \overline{HK}$

20)

Developing Proof Complete the two-column proof by filling in the blanks.

Given: $\overline{BD} \perp \overline{AC}$, \overline{BD} bisects $\angle ABC$

Prove: $\triangle ABD \cong \triangle CBD$

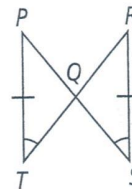


Statements	Reasons
1) $\overline{BD} \perp \overline{AC}$, \overline{BD} bisects $\angle ABC$.	1) Given
2) ?	2) Definition of perpendicular
3) $\angle ADB \cong \angle CDB$	3) ?
4) $\angle ABD \cong \angle CBD$	4) ?
5) ?	5) Reflexive Property of \cong
6) ?	6) ASA

21)

Given: $\overline{PT} \cong \overline{RS}$, $\angle PTR \cong \angle RSP$

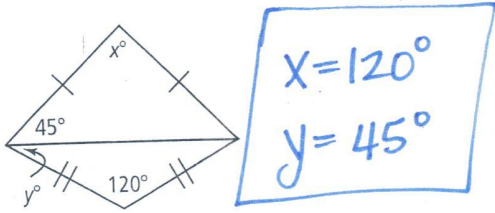
Prove: $\triangle PQT \cong \triangle RQS$



Statements	Reasons
1) ? $\overline{PT} \cong \overline{RS}$, $\angle PTR \cong \angle RSP$	1) Given
2) $\angle PQT \cong \angle RQS$	2) ? Vertical Angles
3) ? $\triangle PQT \cong \triangle RQS$	3) AAS

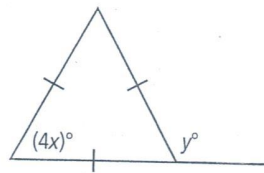
Find the values of x and y .

22)



$$\begin{aligned} x &= 120^\circ \\ y &= 45^\circ \end{aligned}$$

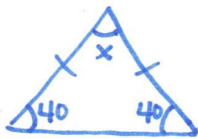
23)



$$\begin{aligned} 4x &= 60^\circ \\ x &= 15^\circ \end{aligned}$$

$$\begin{aligned} y + 60 &= 180^\circ \\ y &= 120^\circ \end{aligned}$$

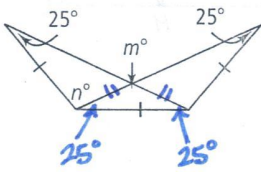
24) You are asked to put a V-shaped roof on a house. The slope of the roof is 40° . What is the measure of the angle needed at the vertex of the roof?



$$\begin{aligned} x + 40 + 40 &= 180 \\ x &= 100^\circ \end{aligned}$$

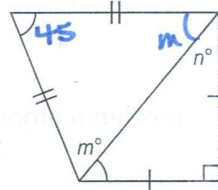
Find the values of m and n .

25)



$$\begin{aligned} m + 2(25) &= 180 \\ m &= 130^\circ \\ n + 25 &= 130 \\ n &= 105^\circ \end{aligned}$$

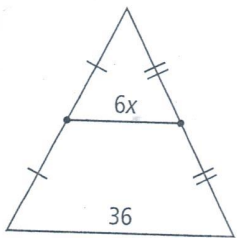
26)



$$\begin{aligned} n &= 45^\circ \\ 45 + 2m &= 180^\circ \\ 2m &= 135 \\ m &= 67.5^\circ \end{aligned}$$

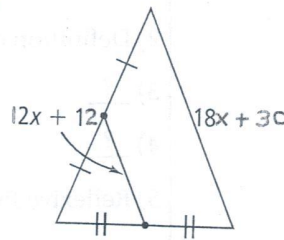
Find the value of x .

27)



$$\begin{aligned} 6x &= \frac{1}{2}(36) \\ 6x &= 18 \\ x &= 3 \end{aligned}$$

28)



$$\begin{aligned} 12x + 12 &= \frac{1}{2}(18x + 30) \\ 12x + 12 &= 9x + 15 \\ -9x - 12 & \quad -9x - 12 \\ \hline 3x &= 3 \\ x &= 1 \end{aligned}$$

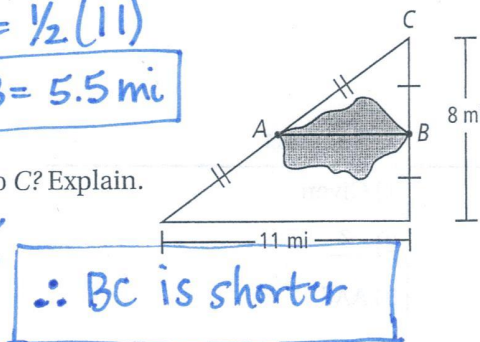
29) What is the distance across the lake?

$$\begin{aligned} AB &= \frac{1}{2}(11) \\ AB &= 5.5 \text{ mi} \end{aligned}$$

30) Is it a shorter distance from A to B or from B to C ? Explain.

5.5

4



$$\therefore BC \text{ is shorter}$$

Find the indicated values of the variables and measures.

Use $\triangle EHF$ for questions 31-33.

31) What are the lengths of \overline{EF} and \overline{EH} ?

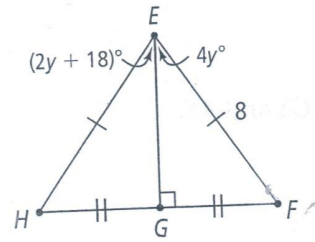
$$\boxed{EF = EH = 8}$$

32) Find the value of y .

$$\boxed{y = 9}$$

33) Find $m\angle GEH$ and $m\angle GEF$.

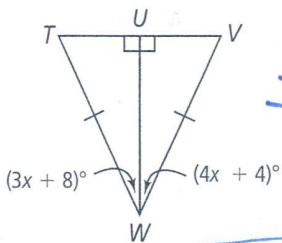
$$\boxed{m\angle GEH = m\angle GEF = 36^\circ}$$



$$\begin{aligned} 2y + 18 &= 4y \\ -2y &\quad -2y \\ \hline 18 &= 2y \\ y &= 9 \end{aligned}$$

$$4y = 4(9)$$

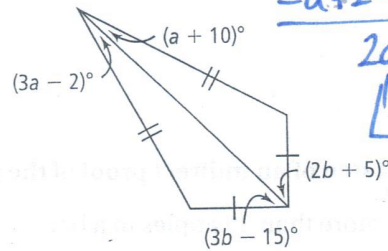
34) x , $m\angle UWV$, $m\angle UWT$



$$\begin{aligned} 3x + 8 &= 4x + 4 \\ -3x - 4 &\quad -3x - 4 \\ \hline 4 &= x \end{aligned}$$

$$\boxed{m\angle UWV = m\angle UWT = 3(4) + 8 = 20^\circ}$$

35) a , b

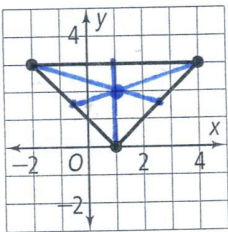


$$\begin{aligned} 3a - 2 &= a + 10 \\ -a + 2 &\quad -a + 2 \\ \hline 2a &= 12 \\ a &= 6 \end{aligned}$$

$$\begin{aligned} 2b + 5 &= 3b - 15 \\ -2b + 15 &\quad -2b + 15 \\ \hline 20 &= b \end{aligned}$$

Find the coordinates of the circumcenter of each triangle.

36)



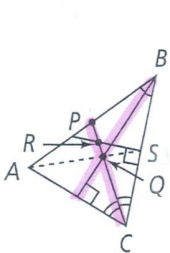
$$\boxed{(1, 2)}$$

37) $P(-3, -5)$
 $Q(-3, 2)$
 $R(1, -5)$

$$\boxed{(-1, -1.5)}$$

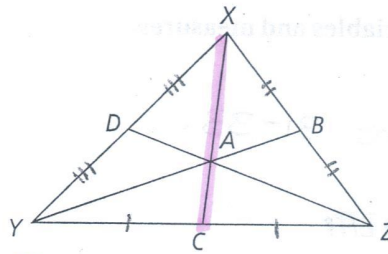
Name the point of concurrency of the angle bisectors.

38)



$$\boxed{Q}$$

In $\triangle XYZ$, A is the centroid.



39) If $AC = 3$, find CX and AX .

$$AC = \frac{1}{3} CX$$

$$(3 = \frac{1}{3} CX) \cdot 3$$

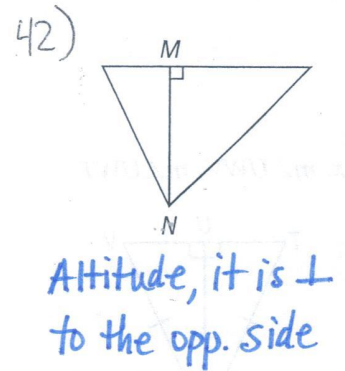
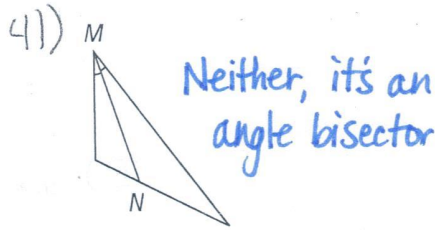
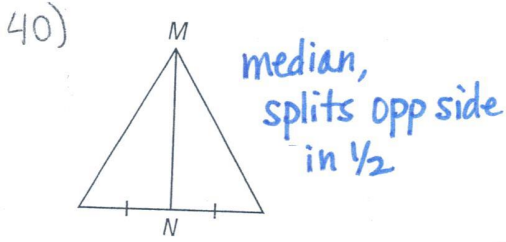
$$CX = 9$$

$$CX = AC + AX$$

$$9 = 3 + AX$$

$$AX = 6$$

Is \overline{MN} a median, an altitude, or neither? Explain.



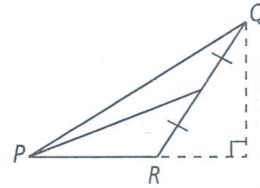
Write the first step of an indirect proof of the given statement.

43) There are more than 20 apples in a box. *There are 20 or less apples in the box.*

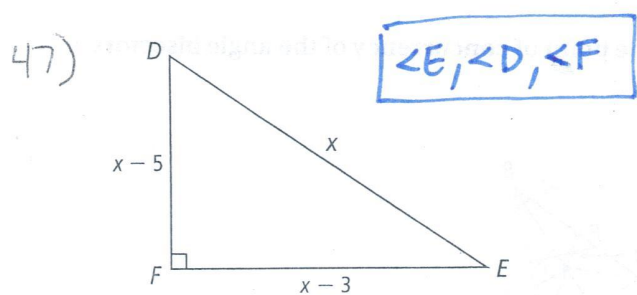
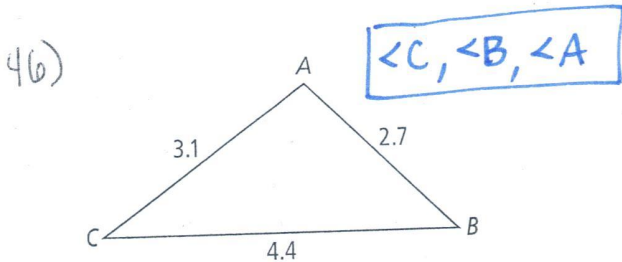
44) If a number ends in x , then it is a multiple of 5.
If a number ends in x , then it is NOT a multiple of 5.

Identify the two statements that contradict each other.

- 45) I. An altitude of $\triangle PQR$ is outside the triangle.
II. $\triangle PQR$ is acute.
III. An median of $\triangle PQR$ is inside the triangle.
- I, II**

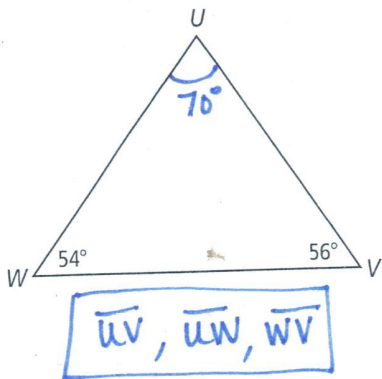


list the angles of each triangle in order from smallest to largest.

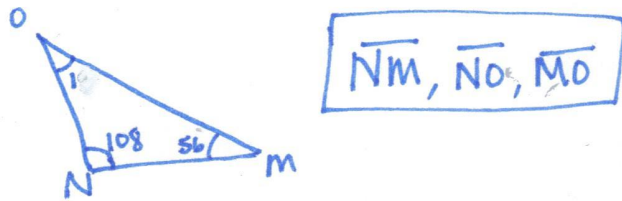


list the sides of each triangle in order from shortest to longest.

48)



49) $\triangle MNO$, where $m\angle M = 56$, $m\angle N = 108$, and $m\angle O = 16$



Can a triangle have sides with the given lengths?

50) 10 in., 13 in., 18 in.

$$\begin{aligned} 10+13 &> 18 \checkmark \\ 10+18 &> 13 \checkmark \\ 13+18 &> 10 \checkmark \end{aligned}$$

\therefore yes!

51) 6 m, 5 m, 12 m

$$6+5 < 12$$

\therefore No!

The lengths of two sides of a triangle are given. Find the range of possible lengths for the third side.

52) 13, 8

$$\begin{aligned} 13+8 &= 21 \\ 13-8 &= 5 \end{aligned}$$

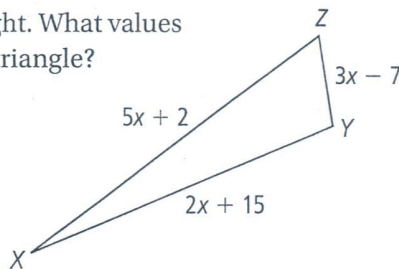
$$5 < x < 21$$

53) 10, 15

$$\begin{aligned} 10+15 &= 25 \\ 15-10 &= 5 \end{aligned}$$

$$5 < x < 25$$

54) Algebra $\triangle XYZ$ has the side lengths shown at the right. What values of x result in side lengths that could be the sides of a triangle? (Hint: Write and solve three inequalities.)



$$(5x+2) + (3x-7) > 2x+15$$

$$\begin{array}{r} 8x-5 > 2x+15 \\ -2x+5 \quad -2x+5 \\ \hline 6x > 20 \end{array}$$

$$x > 20/6$$

$$(3x-7) + (2x+15) > 5x+2$$

$$5x+8 > 5x+2$$

$$8 > 2 \text{ Always!}$$

$$(5x+2) + (2x+15) > 3x-7$$

$$\begin{array}{r} 7x+17 > 3x-7 \\ -3x-17 \quad -3x-17 \\ \hline 4x > -24 \end{array}$$

$$4x > -24$$

$$x > -6$$

$$\therefore x > 20/6$$