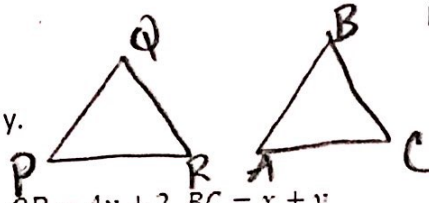


Congruent Triangle Problems - Honors

Name: \_\_\_\_\_

I.  $\triangle PQR \cong \triangle ABC$ . Find the values of  $x$  and  $y$ .



1.  $m\angle R = 5x + 70$ ,  $m\angle C = 24x - 25$ ,  $QR = 4y + 2$ ,  $BC = x + y$

$$5x + 70 = 24x - 25$$

$$95 = 19x$$

$x = 5$

$$4y + 2 = x + y$$

$$4y + 2 = 5 + y$$

$$3y = 3$$

$y = 1$

2.  $m\angle R = 90 - y$ ,  $m\angle C = 13$ ,  $PR = 3x + y - 1$ ,  $AC = 32 - x$

3.  $PQ = 5x - 31$ ,  $QR = -3y - 1$ ,  $BC = x + 1$ ,  $AB = 9 - y$

$$5x - 31 = 9 - y$$

$$-3y - 1 = x + 1$$

$$-3y - 2 = x$$

$$5(-3y - 2) - 31 = 9 - y$$

$$-15y - 10 - 31 = 9 - y$$

$$-15y - 41 = 9 - y$$

$$-14y = 50$$

$y = -3.6$   
 $x = 8.8$

4.  $m\angle A = 15y - 3$ ,  $m\angle P = 43 - x$ ,  $PQ = 11 - x$ ,  $AB = 3y + 1$

5.  $AB = 2x + y$ ,  $PQ = 7$ ,  $BC = 11$ ,  $QR = 4x + y$

$$2x + y = 7$$

$$y = 7 - 2x$$

$$11 = 4x + y$$

$$11 = 4x + 7 - 2x$$

$$4 = 2x$$

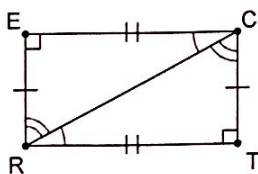
$x = 2$

$y = 3$

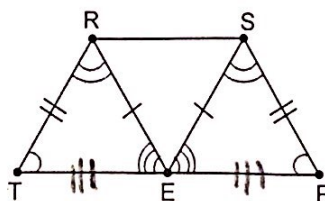
6.  $\triangle XYZ \cong \triangle MNO$ ,  $m\angle X = x + 10$ ,  $m\angle M = y + 20$ ,  $m\angle Y = 3x$ , and  $m\angle N = x + 3y$ . Find  $m\angle X$  and  $m\angle Y$ .

II. Indicate which triangles are congruent. Be sure to have the correspondence of the letters correct.

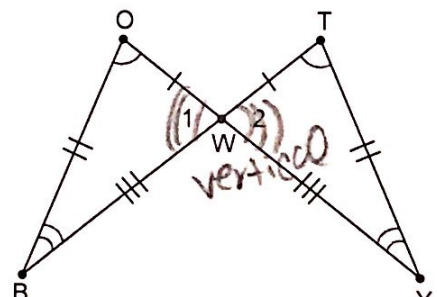
a.  $\triangle ERC \cong \triangle TCR$



b. E is the midpoint of  $\overline{TP}$   
 $\triangle SPE \cong \triangle RTE$



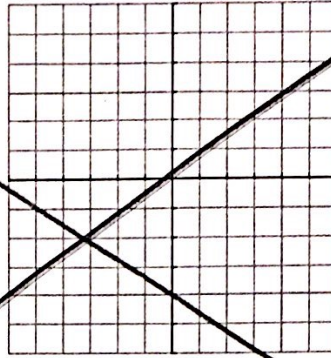
c.  $\triangle BOIV \cong \triangle YTW$



### III. Coordinate Geometry

1. Graph each line on a coordinate plane. Identify two congruent triangles formed by the lines. Explain why the triangles are congruent.

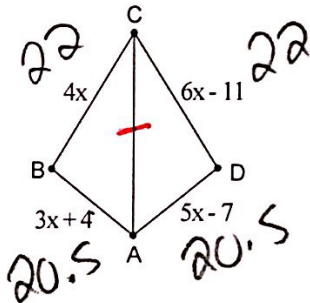
$$x=0, y=0, x=4, y=2x-4$$



2. Consider two triangles,  $\triangle ABC$  and  $\triangle FDE$ , with vertices  $A = (0, 7)$ ,  $B = (-4, 0)$ ,  $C = (0, 0)$ ,  $D = (2, 3)$ ,  $E = (2, -1)$ , and  $F = (8, -1)$ . Draw a diagram and explain why  $\triangle ABC \cong \triangle FDE$ .

### IV. Solve.

1. The perimeter of ABCD is 85. Find the value of  $x$ . Is  $\triangle ABC$  congruent to  $\triangle ADC$ ? Explain.



$$3x+4 + 4x + 6x-11 + 5x-7 = 85$$

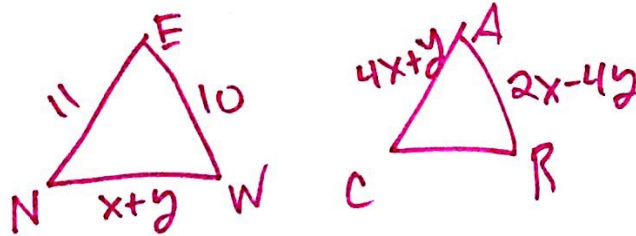
$$18x - 14 = 85$$

$$18x = 99$$

$$x = 5.5$$

2. Given:  $\triangle NEW \cong \triangle CAR$

$$\begin{aligned} EN &= 11 \\ AR &= 2x - 4y \\ NW &= x + y \\ CA &= 4x + y \\ EW &= 10 \end{aligned}$$



Draw the triangles, solve for  $x$  and  $y$ , and find  $CR$ .

$$\begin{aligned} x &= 3 \\ y &= -1 \\ CR &= 2 \end{aligned}$$

$$\begin{aligned} 11 &= 4x + y \\ 10 &= 2x - 4y \\ 11 - 4x &= y \\ 10 &= 2x - 4(11 - 4x) \\ 10 &= 2x - 44 + 16x \\ 54 &= 18x \\ x &= 3 \end{aligned}$$