

Unit 6 Lesson 1

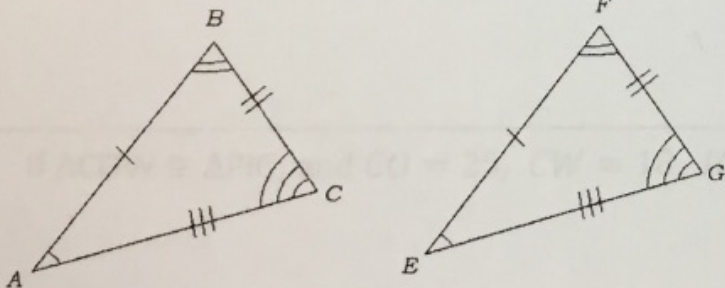
CPCTC

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Lesson 1 → Congruent Triangles & CPCTC

- **Review:** Similar triangles are the SAME SHAPE but DIFFERENT SIZES. In order for two triangles to be similar, the **corresponding angles** must be **congruent** and the **corresponding sides** must be **proportional**.
- **Congruent Triangles:** Triangles that are the same Shape and the same Size.
 - Each triangle has three congruent sides and three congruent angles.
 - If all **SIX** of the corresponding parts of two triangles are ≅, then the triangles are ≅.



$\triangle ABC \cong \triangle FEG$

Congruent Triangles:

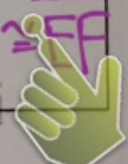
Corresponding Congruent Angles:

$\angle C \cong \angle G$ $\angle B \cong \angle F$ $\angle A \cong \angle E$

Corresponding Congruent Sides:

$\overline{AC} \cong \overline{EG}$, $\overline{BC} \cong \overline{FG}$, $\overline{AB} \cong \overline{FE}$

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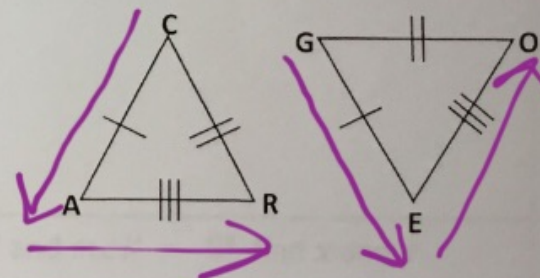
➤ **Definition of Congruent Triangles (CPCTC):**

➤ Definition of Congruent Triangles (CPCTC):

- Two triangles are congruent if and only if their corresponding parts are Congruent.
- CPCTC – Corresponding Parts of Congruent Triangles are Congruent

1. Write a congruency statement for the two triangles at right.

$$\triangle CAR \cong \triangle GEO$$



2. List ALL of the congruent parts if $\triangle EFG \cong \triangle HGF$.

$$\angle E \cong \angle H$$

$$\overline{EF} \cong \overline{HG}$$

$$\angle F \cong \angle G$$

$$\overline{FG} \cong \overline{GF}$$

$$\angle G \cong \angle F$$

$$\overline{EG} \cong \overline{HF}$$

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3. $\triangle WXY \cong \triangle ZYX$ Solve for p and q .

$$\overline{WX} \cong \overline{ZY}$$

$$\begin{aligned} 7p + 13 &= 20 \\ -13 &-13 \end{aligned}$$

$$7p = 7$$

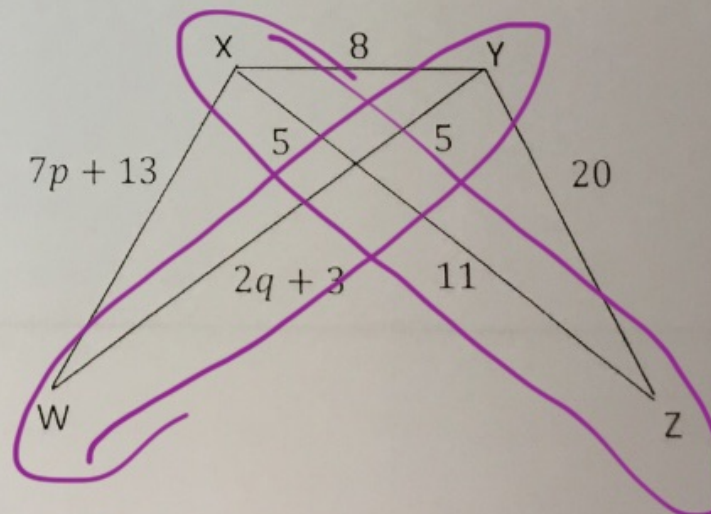
$$p = 1$$

$$2q + 3 + 5 = 11 + 5$$

$$\begin{aligned} 2q + 8 &= 16 \\ -8 &-8 \end{aligned}$$

$$2q = 8$$

$$q = 4$$



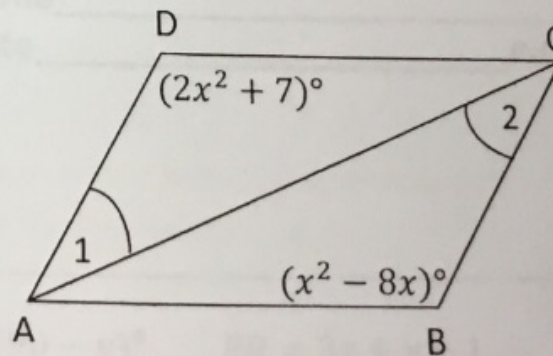
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4. $\triangle ADC \cong \triangle CBA$ Solve for x . Then find the $m\angle B$ & $m\angle D$.

$$2x^2 + 7 = x^2 - 8x$$

$$-x^2 + 8x \quad -x^2 + 8x$$



$$x^2 + 8x + 7 = 0$$

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

$$x = -7 \quad x = -1$$

or

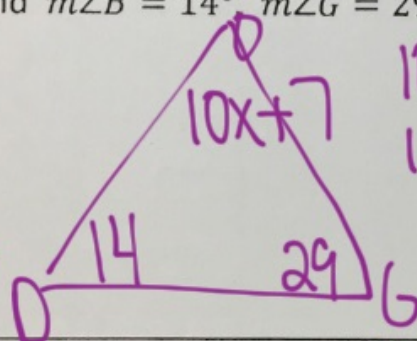
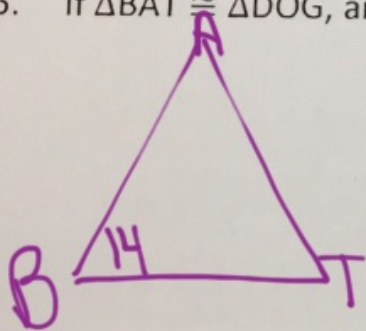
$$m\angle B = 105^\circ \text{ or } 9^\circ$$

$$m\angle D$$

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5. If $\triangle BAT \cong \triangle DOG$, and $m\angle B = 14^\circ$, $m\angle G = 29^\circ$ and $m\angle O = (10x + 7)^\circ$, find x and $m\angle O$.



$$10x + 7 + 14 + 29 = 180$$

$$10x + 50 = 180$$

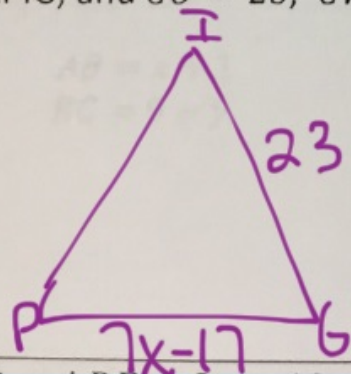
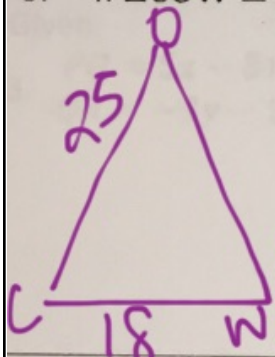
$$\begin{array}{r} -50 \\ -50 \end{array}$$

$$10x = 130$$

$$x = 13$$

$$m\angle O = 137^\circ$$

6. If $\triangle COW \cong \triangle FIG$, and $CO = 25$, $CW = 18$, $IG = 23$ and $PG = 7x - 17$, find x and PG .



$$7x - 17 = 18$$

$$\begin{array}{r} +17 \\ +17 \end{array}$$

$$7x = 35$$

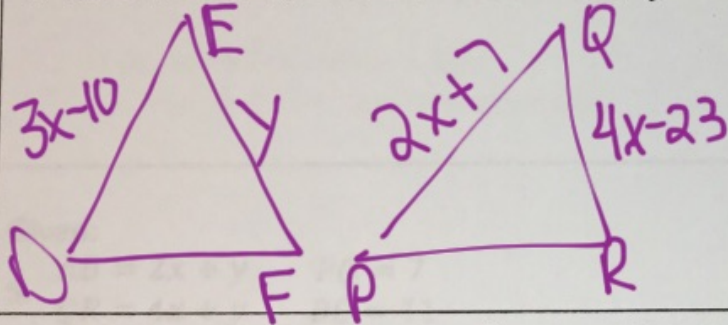
$$x = 5$$

$$PG = 18$$

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7. If $\triangle DEF \cong \triangle PQR$ and $DE = 3x - 10$, $QR = 4x - 23$, $PQ = 2x + 7$ and $EF = y$, find x and y .



$$3x - 10 = 2x + 7$$

$$-2x + 10 \quad -2x + 10$$

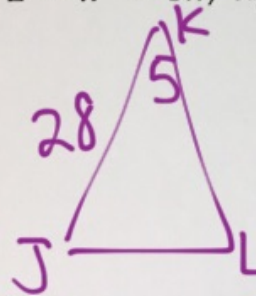
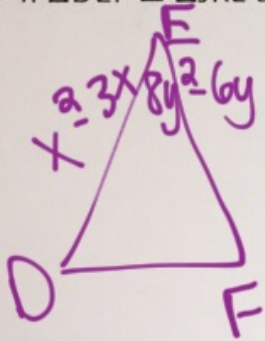
$$\underline{x = 17}$$

$$4x - 23 = y$$

$$4(17) - 23 = y$$

$$\underline{45 = y}$$

8. If $\triangle DEF \cong \triangle JKL$ and $DE = x^2 - 3x$, $KJ = 28$, $m\angle E = (8y^2 - 6y)^\circ$ and $m\angle K = 5^\circ$, find x and y .



$$x^2 - 3x = 28$$

$$-28$$

$$x^2 - 3x - 28 = 0$$

$$(x - 7)(x + 4) = 0$$

$$\underline{x = 7 \quad x = -4}$$

OF

$$8y^2 - 6y = 5$$

$$8y^2 - 6y - 5 = 0$$

$$y^2 - 6y - 40 = 0$$

$$(y - 10)(y + 4)$$

$$\left(y - \frac{10}{8}\right)\left(y + \frac{4}{8}\right)$$

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$$8y^2 - 6y = 5$$

$$8y^2 - 6y - 5 = 0$$

$$y^2 - 6y - 40 = 0$$

$$(y - \frac{10}{8})(y + \frac{4}{8})$$

$$(y - \frac{5}{4})(y + \frac{1}{2})$$

$$(4y - 5)(2y + 1)$$

$$y = \frac{5}{4} \text{ or } y = -\frac{1}{2}$$

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Page 4 and 5 HW

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6)

Triangle PQR: $\angle P = x+10$, $\angle Q = 90$, $\angle R = 3x$. Side $PR = 40$.

Triangle ABC: $\angle A = y+20$, $\angle B = x+3y$, $\angle C = 30+60 = 90$. Side $AC = 40$.

$$x+3y = 3x$$

$$\begin{array}{r} -3x \\ -3y \\ \hline -2x+3y=0 \end{array}$$

$$x+10 = y+20$$

$$\begin{array}{r} -y-10 \\ -y-10 \\ \hline -2x+3y=0 \end{array}$$

$$2(x-y=10)$$

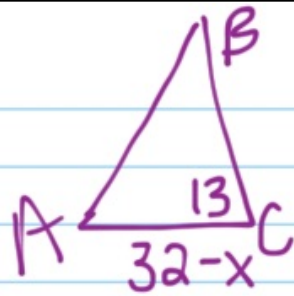
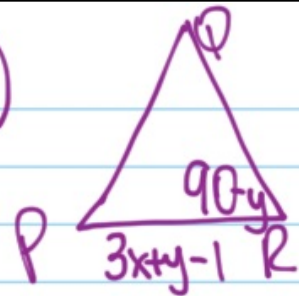
$$\begin{array}{r} -2x+3y=0 \\ \hline 2x-2y=20 \\ -2x+3y=0 \\ \hline y=20 \end{array}$$

$$x - (20) = 10$$

$$\begin{array}{r} x-20=10 \\ +20 \quad +20 \\ \hline x=30 \end{array}$$

x = 30

2)



$$\begin{aligned} 90 - y &= 13 \\ -90 & \quad -90 \\ -y &= -77 \\ y &= 77 \end{aligned}$$

$$3x + (77) - 1 = 32 - x$$

$$\begin{aligned} 3x + 76 &= 32 - x \\ +x & \quad -76 \quad -76 + x \end{aligned}$$

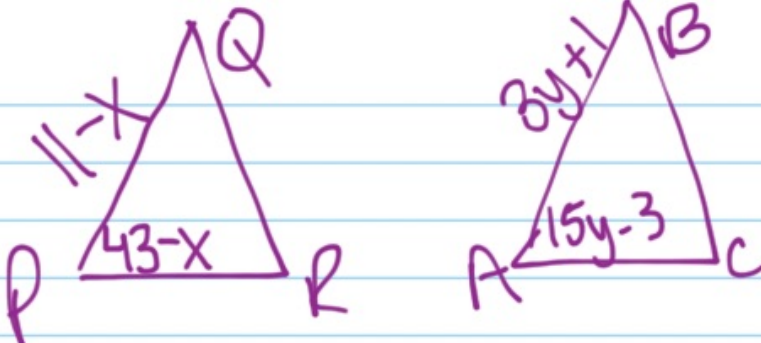
$$\frac{4x}{4} = \frac{-44}{4}$$

$$x = -11$$

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4)




$11 - x = 3y + 1$
 $43 - x = 15y - 3$

$-11 \quad -3y$
 $43 - x = 15y - 3$
 $-43 \quad -15y$
 $- (+x + 3y = +10)$
 $-x - 15y = -46$

$-x - 3(3) = -10$
 $-x - 9 = -10$
 $+9 \quad +9$

$-x = -1$
 $x = 1$

$-12y = -36$
 $-12 \quad -12$
 $y = 3$

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