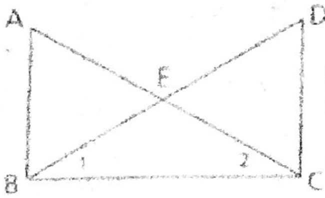
Triangle Congruence Review
Honors Geometry, Glawe

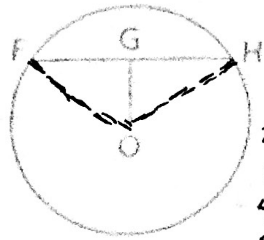
Name: Key Period: ____

1) Given: $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$, $\angle 1 \cong \angle 2$
Conclusion: $\overline{AC} \cong \overline{DB}$



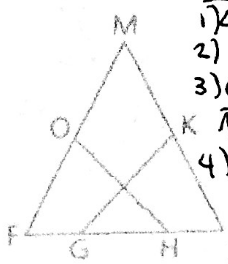
statements	Reasons
1) $\overline{AB} \perp \overline{BC}$	1) Given
2) <ABC is a right angle	2) If two segments are ⊥, then they form right <s
3) $\overline{DC} \perp \overline{BC}$	3) Given
4) <DCB is a right angle	4) same as 2
5) <ABC ≅ <DCB	5) Right <s are congruent
6) <1 ≅ <2	6) Given
7) $\overline{BE} \cong \overline{CE}$	7) If △ then △
8) <ABE ≅ <DCE	8) subtraction Property
9) <AEB ≅ <DEC	9) vertical <s are ≅
10) △AEB ≅ △DEC	10) ASA
11) $\overline{AE} \cong \overline{DE}$	11) CPCTC
12) $\overline{AC} \cong \overline{DB}$	12) Addition Property

2) Given: ⊙O, $\overline{OG} \perp \overline{FH}$
Conclusion: $\overline{FG} \cong \overline{GH}$



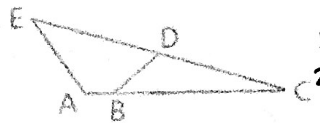
statements	Reasons
1) ⊙O	1) Given
2) Draw $\overline{OF}$ and $\overline{OH}$	2) Two points determine a segment
3) $\overline{OF} \cong \overline{OH}$	3) Radii of a ⊙ are ≅
4) $\overline{OG} \perp \overline{FH}$	4) Given
5) <OGF and <OGH are right <s	5) If two segments are ⊥, then they form right <s
6) $\overline{OG} \cong \overline{OG}$	6) Reflexive property
7) △OGF ≅ △OGH	7) HL
8) $\overline{FG} \cong \overline{GH}$	8) CPCTC

3) Given: $\overline{FJ}$ is the base of an isosceles △.
$\overline{FG} \cong \overline{JH}$;
O is the midpt. of $\overline{MF}$.
K is the midpt. of $\overline{MJ}$.
Conclusion: $\overline{OH} \cong \overline{KG}$



statements	Reasons
1) △FJM is isosceles	1) Given
2) $\overline{FG} \cong \overline{JH}$	2) Given
3) O is midpoint of $\overline{MF}$	3) Given
4) K is midpoint of $\overline{MJ}$	4) Given
5) $\overline{GH} \cong \overline{GH}$	5) Reflexive Property
6) $\overline{FH} \cong \overline{JG}$	6) Addition Property
7) <MFJ ≅ <MJK	7) If △ then △
8) $\overline{OF} \cong \overline{KJ}$	8) Division Property
9) △OFH ≅ △KJG	9) SAS
10) $\overline{OH} \cong \overline{KJ}$	10) CPCTC

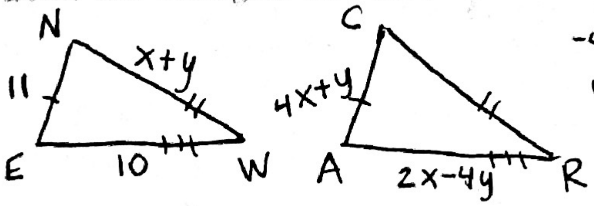
4) Given: $\angle DBC \cong \angle E$
Conclusion: $\angle A \cong \angle BDC$



statements	Reasons
1) <DBC ≅ <E	1) Given
2) <C + <DBC + <BDC = 180	2) The sum of the <s of a △ is 180°.
3) <C + <A + <E = 180	3) same as 2
4) <C + <DBC + <BDC = <C + <A + <E	4) Transitive Property
5) <BDC ≅ <A	5) subtraction property

5) Given: $\triangle NEW \cong \triangle CAR$, $EN = 11$, $AR = 2x - 4y$, $NW = x + y$, $CA = 4x + y$, $EW = 10$

Draw the triangles and find CR.



$\overline{NE} \cong \overline{CA}$

$11 = 4x + y$

$-4x \quad -4x$

$y = -4x + 11$

$\overline{EW} \cong \overline{AR}$

$10 = 2x - 4y$

$10 = 2x - 4(-4x + 11)$

$10 = 2x + 16x - 44$

$+44 \qquad +44$

$54 = 18x$

$x = 3$

$y = -4(3) + 11$

$y = -12 + 11 = -1$

$\overline{CR} \cong \overline{NW}$

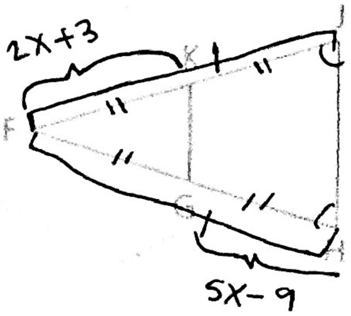
$\overline{CR} = x + y$

$\overline{CR} = 3 + (-1)$

$\boxed{\overline{CR} = 2}$

6) Given: $\triangle FJH$ is isosceles, with base JH.
K and G are midpoints.
$FK = 2x + 3$,
$GH = 5x - 9$,
$JH = 4x$

Find: The perimeter of $\triangle FHJ$



$2x + 3 = 5x - 9$

$-2x + 9 \quad -2x + 9$

$\frac{12}{3} = \frac{3x}{3} \quad x = 4$

$\overline{FK} = 2(4) + 3 = 8 + 3 = 11$

$\overline{FJ} = 2(\overline{FK}) = 2(11) = 22 =$

$\overline{JH} = 4(4) = 16$

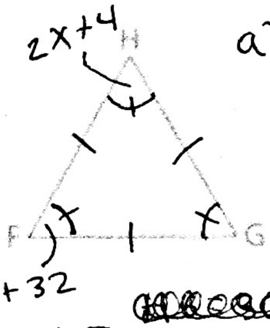
$\rightarrow \overline{FJ} + \overline{FH} + \overline{JH} =$

$22 + 22 + 16 = \boxed{60}$

7) $\triangle HGF$ is equilateral.

a If $\angle F = (x + 32)°$ and $\angle H = (2x + 4)°$, solve for x and find $m\angle G$.

b If the perimeter of $\triangle HGF = 6y + 24$ and $HG = 3y - 7$, find the perimeter of $\triangle HGF$.



a) $\angle F \cong \angle H$

$x + 32 = 2x + 4$

$-x \quad -4 \quad -x \quad -4$

$\boxed{28 = x}$

$m\angle F = 28 + 32 = 60$

$\angle F \cong \angle G \quad \boxed{m\angle G = 60}$

$\rightarrow (3y - 7)3 = 6y + 24$

$9y - 21 = 6y + 24$

$-6y + 21 \quad -6y + 21$

$3y = 45$

$y = 15$

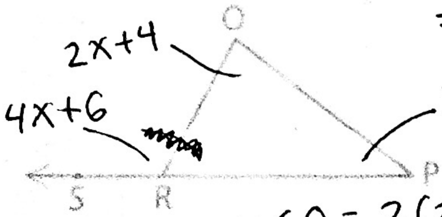
$\triangle HGF = 6y + 24$

$= 6(15) + 24$

$= \boxed{114}$

8) Given: $\angle ORS = (4x + 6)°$,
$\angle P = (x + 24)°$,
$\angle O = (2x + 4)°$

Find: $m\angle O$



$\angle O + \angle P = \angle ORS$

$2x + 4 + x + 24 = 4x + 6$

$3x + 28 = 4x + 6$

$-3x \quad -6 \quad -3x \quad -6$

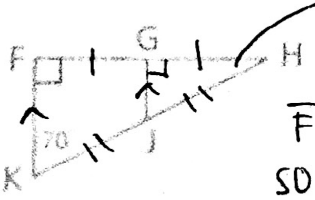
$x = 22$

$m\angle O = 2(22) + 4$

$= 44 + 4 = \boxed{48}$

9) Given: Diagram as marked;
G and J are midpoints.

Find: $m\angle H$, $m\angle HGJ$, and $m\angle HJG$



$m\angle H$: $180 = m\angle H + 90 + 70$

$180 = m\angle H + 160$

$\boxed{m\angle H = 20}$

$\overline{FK} \parallel \overline{GJ}$ by Midsegment Theorem

so $\boxed{m\angle HGJ = 90}$

$m\angle HJG$: $180 = m\angle HJG + 90 + 20$

$180 = m\angle HJG + 110$

$\boxed{m\angle HJG = 70}$