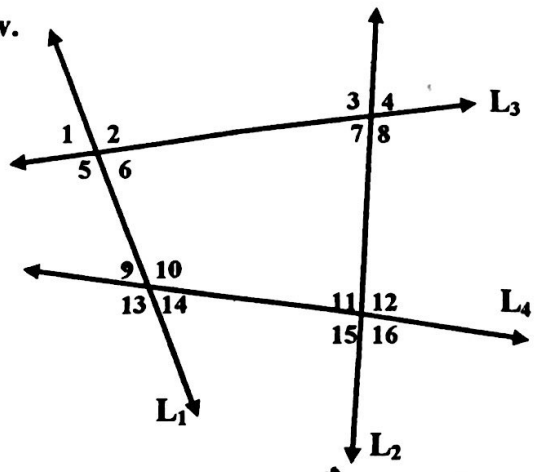
Geometry: Unit 6 Review Name _____

I. Use the figure at the right to answer the questions below.



1. Name the ***alternate interior angles for L_3 and L_4***

   a) using L_1 as a transversal

   2,9 5,10

   b) using L_2 as a transversal

   7,12 8,11

2. Name the ***corresponding angles***

   a) for L_1 and L_2 using L_3 as a transversal 2,4 | 6,8 | 7,5 | 3,1

   b) for L_3 and L_4 using L_2 as a transversal

   4,12 | 8,16 | 7,15 | 3,11

3. Name the ***same-side interior angles***

   a) for L_1 and L_2 using L_3 as a transversal 2,3 | 6,7

   b) for L_1 and L_2 using L_4 as a transversal

   10,11 | 14,15

4. Name all pairs of ***vertical angles***

   1,6 | 2,5 | 10,13 | 9,14 | 3,8 | 4,7 | 11,16 | 15,12

5. In #s 1-4 above, which pairs of angles are congruent?

   If lines are parallel → alt. int. ∠s ≅, corresponding ∠s ≅, and vertical ∠s ≅

6. If $\angle 1 \cong \angle 9$, which pair of lines are parallel? Why?

   $L_3 \parallel L_4$ Corr. ∠s ≅

7. If $\angle 6 \cong \angle 3$, which pair of lines are parallel? Why?

   $L_1 \parallel L_2$ alt int ∠s ≅

8. If $\angle 5 \cong \angle 4$, which pair of lines are parallel? Why?

   $L_1 \parallel L_2$ alt ext ∠s ≅

II. True or False IMPLIED PARALLEL LINES

1. Alternate interior angles are always congruent. T
2. Corresponding angles are congruent. T
3. If 2 lines are parallel, then same-side interior angles are congruent. F

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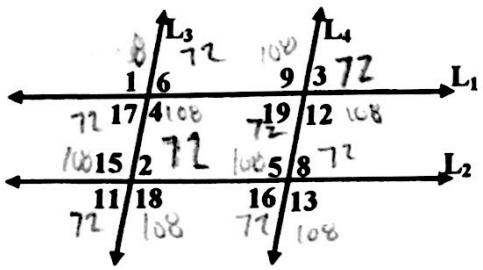
III. $L_1 \parallel L_2$ and $L_3 \parallel L_4$; $m\angle 2 = 72$. **Find the measures of all the other angles.**



IV. **Use the above figure to find the value of x and the measure of each angle.**

1. $m\angle 1 = 3x - 10$
   $m\angle 5 = x + 70$
   110°
   $3x - 10 = x + 70$
   $2x - 80$
   $x = 40$

2. $m\angle 2 = x + 27$
   $m\angle 4 = 2x - 36$
   90, 90
   $3x - 9 = 180$
   $x = 63$

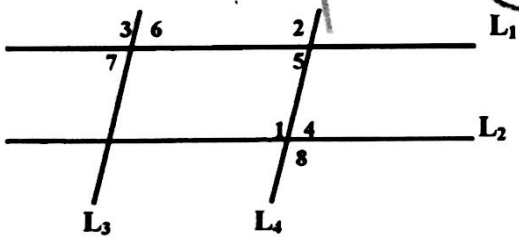
3. $m\angle 3 = 910 - 3x$
   $m\angle 5 = x - 90$
   230°
   −50°
   $-2x + 820 = 180$
   $-2x = 640$
   $x = 320$

4. $m\angle 16 = 8x - 80$
   $m\angle 15 = -2x + 116$
   68°
   112°
   $6x + 36 = 180$
   $6x = 144$
   $x = 24$

5. $m\angle 12 = x + 72$
   $m\angle 3 = -16x + 171$
   $-15x + 243 = 180$
   $-15x = -63$
   $x = \frac{63}{7}$

V. **Proofs**

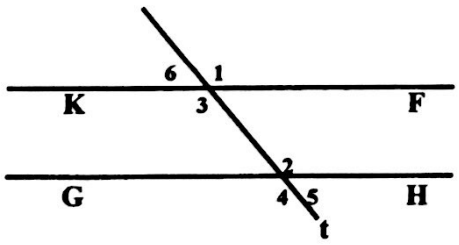
1.



Given: $L_1 // L_2$
$L_3 // L_4$
Prove: $\angle 1 \cong \angle 3$

S	R
$L_1 \parallel L_2$	Given
$L_3 \parallel L_4$	
$\angle 1 \cong \angle 2$	Corr $\angle$s $\cong$
$\angle 2 \cong \angle 3$	
$\angle 1 \cong \angle 3$	Sub

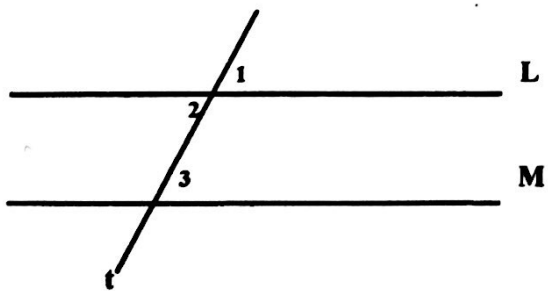
2.

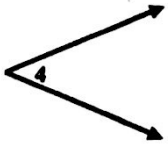


Given: $\angle 1 \cong \angle 4$
Prove: FK // HG

S	R
$\angle 1 \cong \angle 4$	Given
FK // HG	Alt ext $\angle$s $\cong$

3.





Given: L // M
$\angle 1 \cong \angle 4$
Show: $\angle 3 \cong \angle 4$

S	R
L // M	
$\angle 1 \cong \angle 4$	Given
$\angle 1 \cong \angle 3$	Corr $\angle$s
$\angle 3 \cong \angle 4$	Sub

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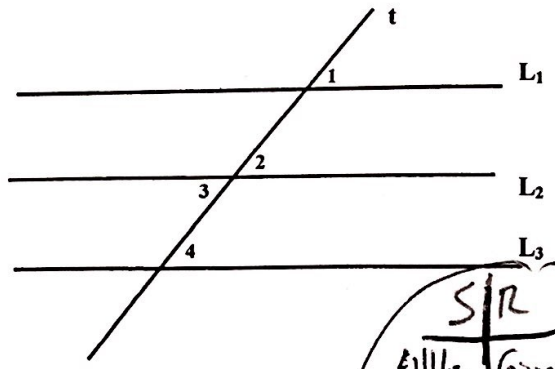
4.

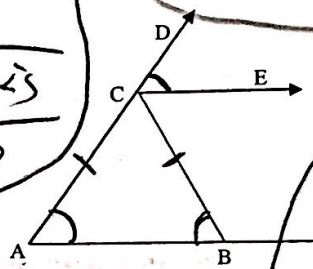


Given: $L_1 // L_2$, $L_2 // L_3$
Show: $\angle 1 \cong \angle 4$

S	R
$L_1 \| L_2$, $L_2 \| L_3$	Given
$L_1 \| L_3$	sub/transitive
$\angle 1 \cong \angle 4$	corr $\angle$s

S	R
$L_1 \| L_2$, $L_2 \| L_3$	Given
$\angle 1 \cong \angle 2$, $\angle 2 \cong \angle 4$	corr $\angle$s
$\angle 1 \cong \angle 4$	sub

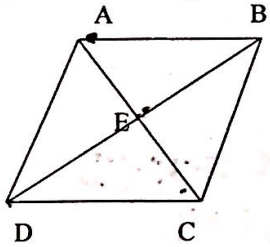
5. . Given: $AC = BC$ and $\angle DCE \cong \angle B$
Prove: $\overline{CE} // \overline{AB}$



S	R
$AC = BC$, $\angle DCE \cong \angle B$	given
$\angle A \cong \angle B$	isos $\triangle$
$\angle DCE \cong \angle A$	sub
$CE \| AB$	corr $\angle$s $\cong$

Part VI: Parallelograms

1.



given ▱ ABCD with $AE = 2x + 9$, $BE = \frac{1}{3}y + 12$, $CE = 19$, $DE = 20$

Find x and y. What property?

2. Use picture in #1. $AB = 6x + 40$, $DC = x^2 - 120$. Find x

$x^2 - 6x - 160 = 0$
$(x-16)(x+10)$

3. Use picture in #1. $AB = 2x + 3y$, $BC = 3x + 2y$, $DC = 26$, $AD = 24$. Find x and y

$-3(2x + 3y = 26)$
$2(3x + 2y = 24)$
$-6x - 9y = -78$
$6x + 4y = 48$
$-5y = -50$
$y = 10$
$x = -2$

4. $CAD = 3x + 12$, $M\angle ACB = 5x - 12$. Find x

$x = 12$

5. $AB = 3x + 5$ $DC = 5x - 20$

a) Find x

$x = 12.5$

b) What properties of parallelograms did you use?

opp sides $\cong$

6. $AE = 3x + y$ $EC = 12$ $DE = 2x - 3y$ $BE = 21$

a) Find x & y

b) What properties of parallelograms did you use?

$3(3x + y = 12)$
$2x - 3y = 21$
$9x + 3y = 36$
$11x = 57$
$x = \frac{57}{11}$

$3\left(\frac{57}{11}\right) + y = 12$
$\frac{171}{11} + y = 11$
$y = \frac{121}{11} - \frac{171}{11}$
$y = \frac{-50}{11}$

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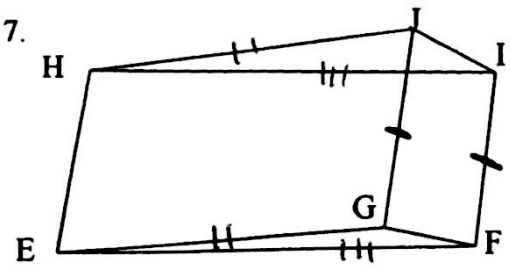
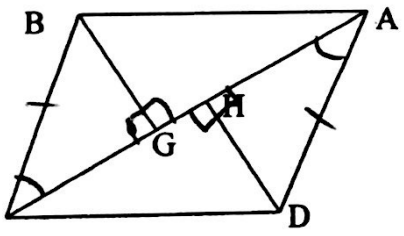
7.



Given: ▱EFIH, ▱EGJH
Prove: JIFG is ▱

S	R
	Given
$\overline{EH} \cong \overline{GI}$ $EH = FI$	opp sides of par $\cong$
$GI = FI$	Sub
$\overline{HJ} \cong \overline{EG}$	opp sides of parallelogram

8.



Given: ▱ABCD; $\overline{DH} \perp \overline{AC}$; $\overline{AC} \perp \overline{BG}$

Prove: $\overline{HD} \cong \overline{GB}$

S	R
▱ABCD $DH \perp AC$ $AC \perp BG$	Given
$\overline{BC} \cong \overline{AD}$	opp sides of parallelogram
$\angle BCG \cong \angle DAH$	Alt int $\angle$s
$\triangle BCG \cong \triangle DAH$	AAS
$\overline{HD} \cong \overline{GB}$	CPCTC

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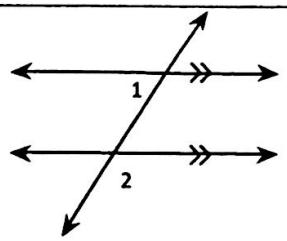
Honors Math 3
Unit 6 Review Sheet

Name: _____
Date: _____

1)



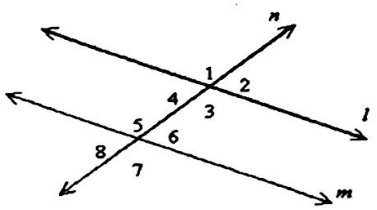
The measure of ∠1 is 3x + 2, and the measure of ∠2 is 7x – 10. Find the degree measure of ∠1.

$3(18.8)+2$
$56.4+2$
$\angle 1 = 58.4°$

$3x+2+7x-10=180$
$10x-8=180$
$10x=188$
$x=18.8$

2) Find the relationship between each pair of angles.

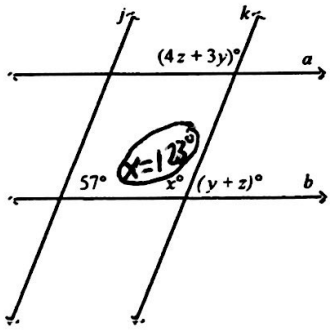
a) ∠1 and ∠2 linear pair
b) ∠1 and ∠3 vertical
c) ∠1 and ∠5 corresponding
d) ∠2 and ∠8 alt exterior
e) ∠3 and ∠5 alt interior
f) ∠4 and ∠5 consecutive



3) Using the picture above, find x if the measure of ∠2 is 2x + 3 and if the measure of ∠5 is 8 – 4x.

$2x+3+8-4x=180$
$11-2x=180$
$-2x=169$
$x=-\frac{169}{2}$

4) Given $a \parallel b$. Find the value of z.

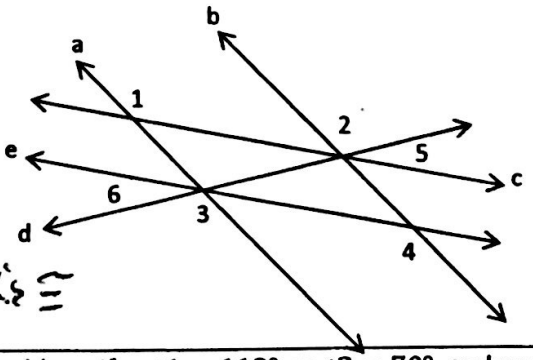


$4z+3y=123$
$z+y=57$
$4z+3y=123$
$-3z-3y=-171$
$z=-48$

5)a) If ∠2 and ∠3 are congruent, which lines can be proven parallel? a||b

b) Why? alt ext ∠'s ≅

c) Given ∠5 and ∠6 are congruent, write prove c || e. alt ext ∠'s ≅



6) Using the picture from the previous problem, If $m\angle 1 = 112°$, $m\angle 3 = 70°$, and $m\angle 3 + m\angle 6 = 3x - 2$, find $m\angle 6$.

$m\angle 6 + m\angle 3 = m\angle 1$
alt ext ∠'s

$m\angle 6 + 70 = 112$
$m\angle 6 = 42°$

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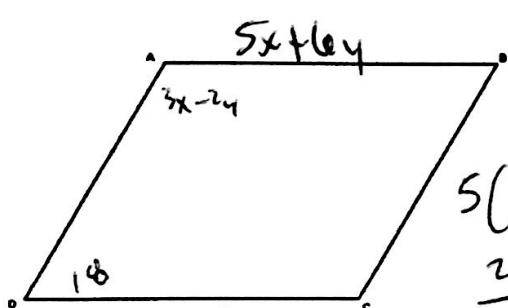
7) Use the following information about the parallelogram to find the values of x and y.

AB = 5x + 6y, CD = 15

$m\angle D = 18$, $m\angle A = 3x - 2y$



$5x+6y=15$
$3x-2y=162$

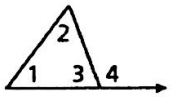
$5x+6y=15$
$9x-6y=486$
$14x=501$

$x=\frac{501}{4}$

$5\left(\frac{501}{4}\right)+6y=15$
$\frac{2505}{4}+6y=15$
$6y=-\frac{2445}{4}$
$y=\frac{-2445}{2}$

8) Use what you know about angles to write a two-column proof.

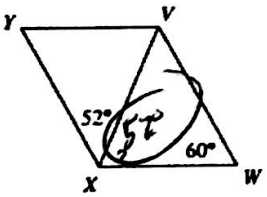
Given: ΔMNP
Prove: $m\angle 1 + m\angle 2 = m\angle 4$



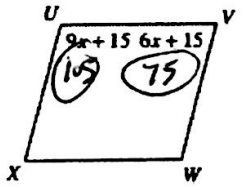
Statements	Reasons
ΔMNP	Given
$m\angle 1+m\angle 2+m\angle 3=180°$	Triangle angle sum
$m\angle 4+m\angle 3=180°$	∠s pair
$m\angle 4+m\angle 3=m\angle 1+m\angle 2+m\angle 3$	sub
$m\angle 4=m\angle 1+m\angle 2$	add prop of =

9) Solve for the missing angle. Remember there are 360° in a quadrilateral!

a)

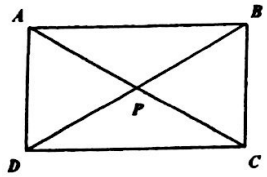


b)



$15x+30=180$
$15x=150$
$x=10$

10) In rectangle *ABCD*, AC = -6x - 2, BP = -4x - 3, and DP = -6x – 19. Find the length of AC.



$-4x-3=-6x-14$
$2x=-16$
$x=-8$

$AC=-6(-8)-2$
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11) Solve for the variables.

$a+30=60$

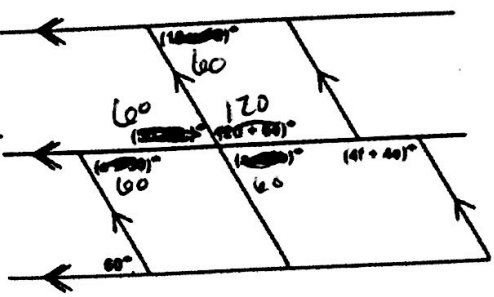
$a+2b=60$
$30+2b=60$
$2b=30$

$15b-5c=60$
$5(15)-5c=60$
$75-5c=60$
$5c=-15$

$10c+d=60$
$30+d=60$

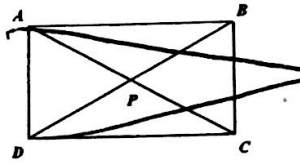
$120=2d+6e$
$60=6e$

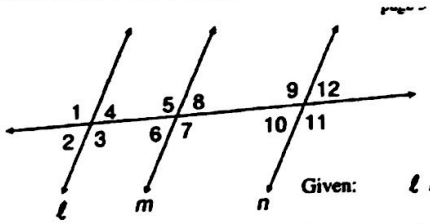
$120=4f+4(10)$
$120=4f+40$
$f=20$



a = 30 b = 15 c = 3
d = 30 e = 10 f = 20

12) In rectangle $ABCD$, AC = -6x - 2, BP = -4x - 3, and DP = -6x – 19. Find the length of AC.





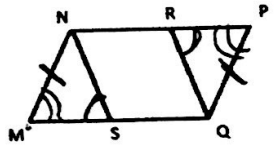
Given: $\ell \parallel m$; $m \parallel n$

Prove: $\angle 4 \cong \angle 10$

Statements	Reasons
$\ell \parallel m$ $m \parallel n$	given
$\ell \parallel n$	transitive or substitution
$\angle 4 \cong \angle 10$	alt int $\angle$s

Given: MNPQ is a parallelogram.
$\angle PRQ \cong \angle MSN$

Prove: $\overline{NS} \cong \overline{QR}$



Statements	Reasons
MNPQ is par $\angle PRQ \cong \angle MSN$	Given
$MN \cong PQ$	opp sides of par
$\angle M \cong \angle P$	opp $\angle$s of par
$\triangle MNS \cong \triangle PQR$	AAS
$NS \cong QR$	CPCTC

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