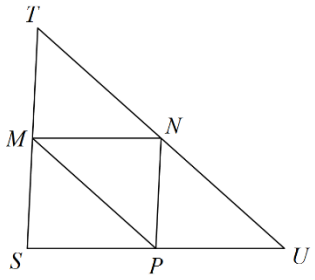
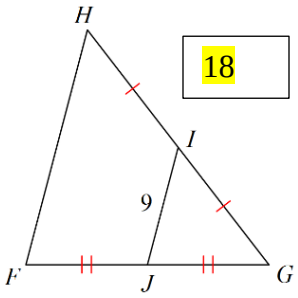
Name: _____Hr:____ **Triangle Proofs ws KEY**

1. Name the parallel segment

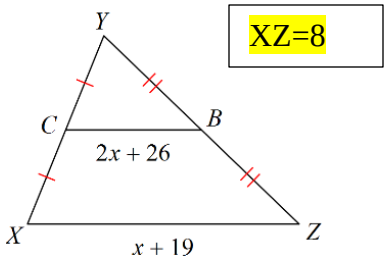


$\overline{MP} \parallel$ $\overline{TU}$

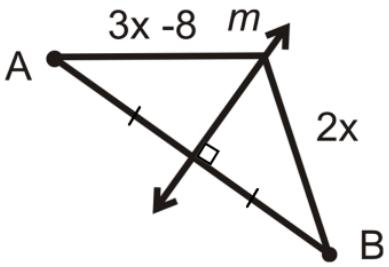
2. Find HF



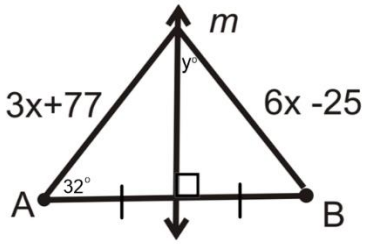
3. Find XZ



4. Solve for x. x = 8

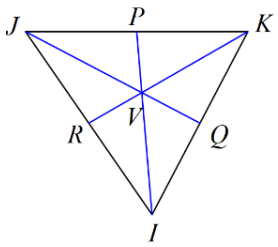


5. Solve for x and y **X = 34** **y = 58º**



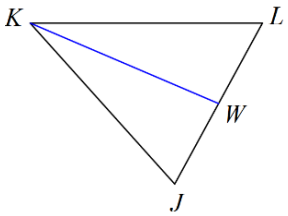
For problems 6-8 assume the segments that appear to be medians are medians.

6. Find VR if $KR = 33$



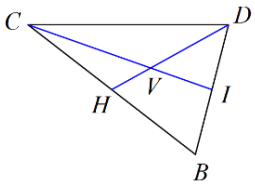
VR = 11

7. Find JL if $WL = 2.1$



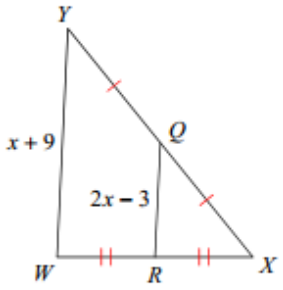
JL = 4.2

8. Find x if $CI = 5x + 11$ and $VI = 5x - 9$



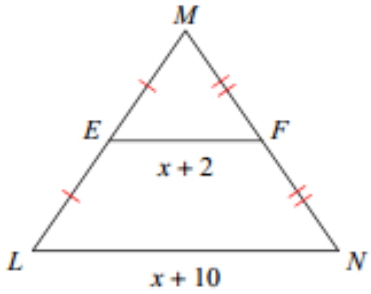
x = 3.8

9. Given: $\overline{QR}$ is a midsegment of $\triangle XYW$
Prove: $x=5$



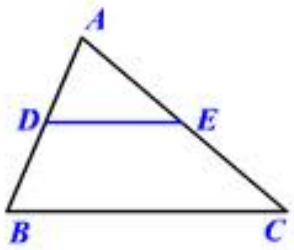
Statement	Reason
1. $\overline{QR}$ is a midsegment of $\triangle XYW$	1. Given
2. $\overline{QR}=\frac{1}{2}\overline{YW}$	2. Midsegments are half the length of the base
3. $\overline{YW}=x+9$; $\overline{QR}=2x-3$	3. Given
4. $2x-3=\frac{1}{2}(x+9)$	4. Substitution property of equality
5. $4x-6=x+9$	5. Multiplication property of equality
6. $3x-6=9$	6. Subtraction property of equality
7. $3x=15$	7. Addition property of equality
8. $x=5$	8. Division property of equality

10. Given: $\overline{EF}$ is a midsegment of $\triangle MLN$
Prove: $x=6$



Statement	Reason
1. $\overline{EF}$ is a midsegment of $\triangle MLN$	1. Given
2. $\overline{EF}=\frac{1}{2}\overline{LN}$	2. Midsegments are half the length of the base
3. $\overline{LN}=x+10$; $\overline{EF}=x+2$	3. Given
4. $x+2=\frac{1}{2}(x+10)$	4. Substitution property of equality
5. $2x+4=x+10$	5. Multiplication property of equality
6. $x+4=10$	6. Subtraction property of equality
7. $x=6$	7. Subtraction property of equality

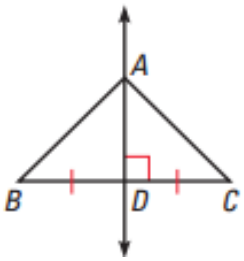
11. Given: $\angle A = 75^\circ$
$\angle ADE = 80^\circ$
$\overline{DE}$ is a midsegment in $\triangle ABC$
Prove: $\angle C = 25^\circ$



Statement	Reason
1. $\angle A = 75^\circ$; $\angle ADE = 80^\circ$	1. Given
2. $\angle A + \angle ADE + \angle AED = 180^\circ$	2. All angles sum to 180° in a triangle
3. $75^\circ + 80^\circ + \angle AED = 180^\circ$	3. Substitution property of equality
4. $155^\circ + \angle AED = 180^\circ$	4. Substitution property of equality
5. $\angle AED = 25^\circ$	5. Subtraction property of equality
6. $\overline{DE}$ is a midsegment in $\triangle ABC$	6. Given
7. $\overline{DE} \parallel \overline{BC}$	7. Midsegments are parallel to the base
8. $\angle AED \cong \angle C$	8. Corresponding angles are congruent
9. $\angle C = 25^\circ$	9. Transitive property of equality

Prove the Perpendicular Bisector Theorem

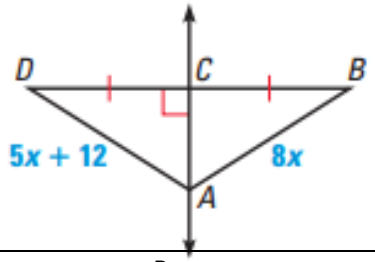
12. Given: $\overleftrightarrow{AD}$ is the $\perp$ bisector of $\overline{BC}$
Prove: $AB = AC$



Statement	Reason
1. $\overleftrightarrow{AD}$ is the $\perp$ bisector of $\overline{BC}$	1. Given
2. $\overline{DB} \cong \overline{DC}$	2. Definition of a bisector
3. $\angle ADC$ and $\angle ADB$ are right angles	3. Definition of Perpendicular
4. $\angle ADC \cong \angle ADB$	4. Right angles are congruent
5. $\overline{AD} \cong \overline{AD}$	5. Reflexive Property of Congruence
6. $\triangle ADB \cong \triangle ADC$	6. SAS
7. $\overline{AB} \cong \overline{AC}$	7. CPCTC
8. $AB = AC$	8. Definition of Congruent segments

13. Given: $\overleftrightarrow{AC}$ is the $\perp$ bisector of $\overline{DB}$

Prove: $AB = 32$

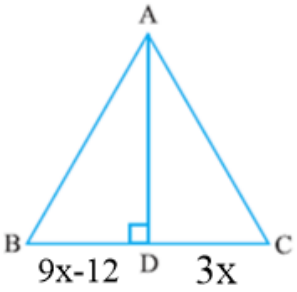


Statement	Reason
1. $\overleftrightarrow{AC}$ is the $\perp$ bisector of $\overline{DB}$	1. Given
2. $\overline{AB} = \overline{AD}$	2. Perpendicular bisector theorem
3. $AD = 5x+12$; $AB = 8x$	3. Given
4. $8x = 5x+12$	4. Substitution property of equality
5. $3x = 12$	5. Subtraction property of equality
6. $x = 4$	6. Division property of equality
7. $AB = 8(4)$	7. Substitution property of equality
8. $AB = 32$	8. Substitution property of equality

14. Given: $AB = AC$

$\angle ADB = 90^\circ$

Prove: $BD = 6$

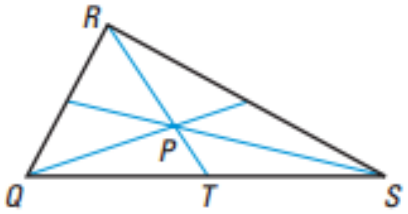


Statement	Reason
1. $AB = AC$	1. Given
2. $\overline{AD} \perp \overline{BC}$	2. Converse of perpendicular bisector theorem
3. $\overline{BD} = \overline{DC}$	3. Definition of a Bisector
4. $DC = 3x$ $BD = 9x-12$	4. Given
5. $9x-12 = 3x$	5. Substitution property of equality
6. $6x-12 = 0$	6. Subtraction property of equality
7. $6x = 12$	7. Addition property of equality
8. $x = 2$	8. Division property of equality
9. $BD = 9(2)-12$	9. Substitution property of equality
10. $BD = 6$	10. Substitution property of equality

15. Given: P is the centroid of $\triangle QRS$

$PT = 5$

Prove: $RT = 15$

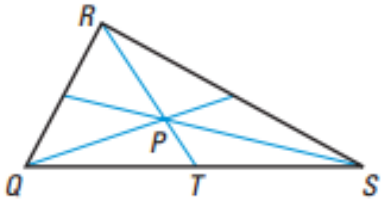


Statement	Reason
1. P is the centroid of $\triangle QRS$	1. Given
2. $PR = \frac{2}{3}RT$	2. Medians of a Triangle Theorem
3. $PR + PT = RT$	3. Segment Addition Postulate
4. $\frac{2}{3}RT + PT = RT$	4. Substitution Property of Equality
5. $PT = \frac{1}{3}RT$	5. Subtraction Property of Equality
6. $PT = 5$	6. Given
7. $5 = \frac{1}{3}RT$	7. Substitution Property of Equality
8. $15 = RT$	8. Multiplication Property of Equality
9. $RT = 15$	9. Symmetric Property of Equality

16. Given: P is the centroid of $\triangle QRS$

$PR = 26$

Prove: $PT = 13$



Statement	Reason
1. P is the centroid of $\triangle QRS$	1. Given
2. $PR = \frac{2}{3}RT$	2. Medians of a Triangle Theorem
3. $PR = 26$	3. Given
4. $26 = \frac{2}{3}RT$	4. Transitive Property of Equality
5. $39 = RT$	5. Multiplication Property of Equality
6. $PR + PT = RT$	6. Segment Addition Postulate
7. $26 + PT = 39$	7. Substitution Property of Equality
8. $PT = 13$	8. Subtraction Property of Equality