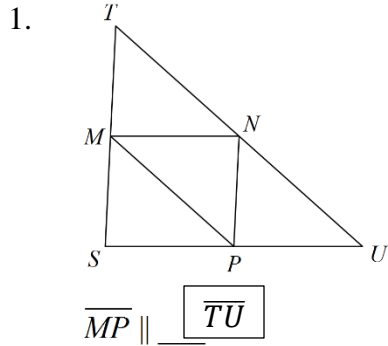
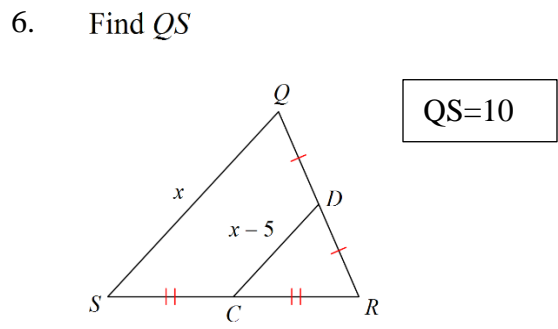
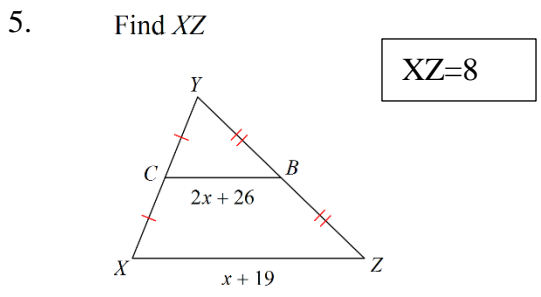
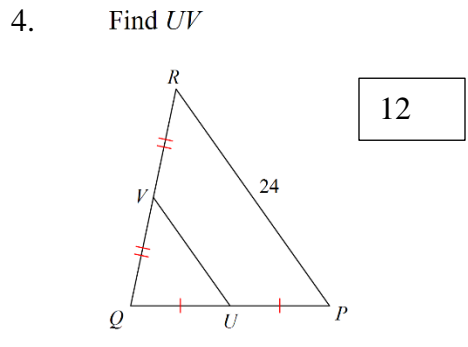
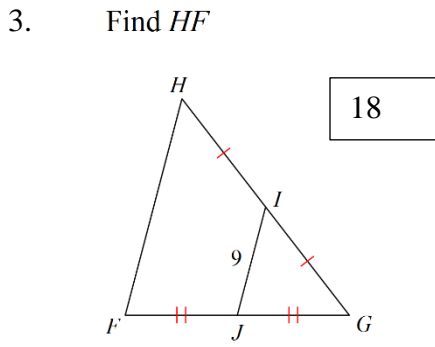
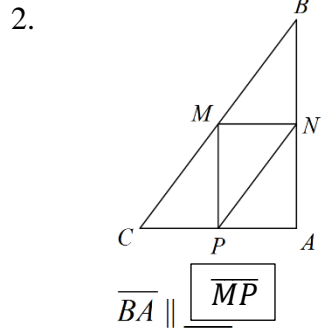


8.3 Midsegment Proofs

Name the parallel segment.



Name: _____ Key _____



Graph A, B, and C. Determine the midsegment \overline{EF} that joins \overline{AB} and \overline{BC} in each triangle. Show that the midsegment is parallel to \overline{AC} and half its length.

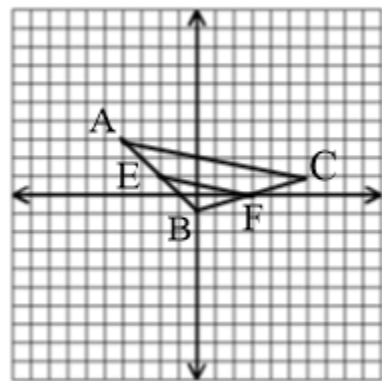
7) A (-4, 3) B(0,-1) C (6, 1)

Midpoint of \overline{AB} : E $(-2,1)$

Midpoint of \overline{BC} : F $(3,0)$

Slope of \overline{AC} : $-\frac{1}{5}$ Distance of \overline{AC} : $\sqrt{104} \approx 10.2$

Slope of \overline{EF} : $-\frac{1}{5}$ Distance of \overline{EF} : $\sqrt{26} \approx 5.1$

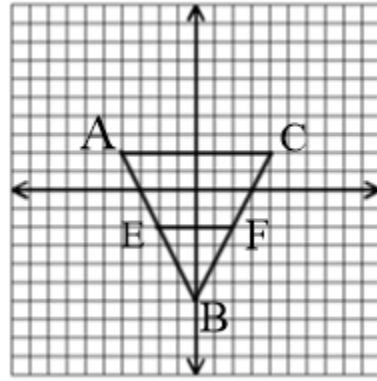


8) A (-4, 2) B(0,-6) C (4, 2)
 Midpoint of \overline{AB} : E (-2, -2)

Midpoint of \overline{BC} : F (2, -2)

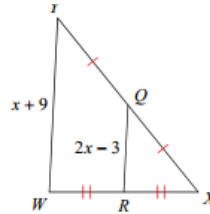
Slope of \overline{AC} : 0 Distance of \overline{AC} : 4

Slope of \overline{EF} : 0 Distance of \overline{EF} : 4



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

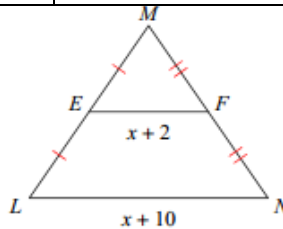
Prove: $x = 5$



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

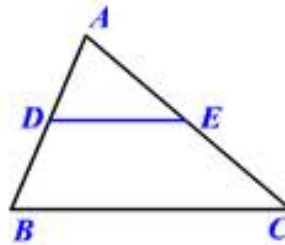
10. Given: \overline{EF} is a midsegment of $\triangle MLN$

Prove: $x = 6$



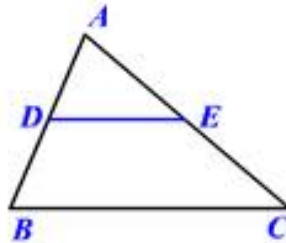
Statement	Reason
1. \overline{EF} is a midsegment of $\triangle MLN$	1. Given
2. $\overline{EF} = \frac{1}{2}\overline{LN}$	2. Midsegments are half the length of the base
3. $\overline{LN} = x+10$; $\overline{EF} = x+2$	3. Given
4. $x+2 = \frac{1}{2}(x+10)$	4. Substitution property of equality
5. $2x+4 = x+10$	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
3. $\angle A + \angle ADE + \angle AED = 180^\circ$	3. All angles sum to 180° in a triangle
4. $75^\circ + 80^\circ + \angle AED = 180^\circ$	4. Substitution property of equality
5. $155^\circ + \angle AED = 180^\circ$	5. Substitution property of equality
6. $\angle AED = 25^\circ$	6. Subtraction property of equality
7. \overline{DE} is a midsegment in $\triangle ABC$	7. Given
8. $\overline{DE} \parallel \overline{BC}$	8. Midsegments are parallel to the base
9. $\angle AED \cong \angle C$	9. Corresponding angles are congruent
10. $\angle C = 25^\circ$	10. Transitive property of equality

12. Given: \overline{DE} is a midsegment in $\triangle ABC$
 $\angle AED = 30^\circ$
 $\angle B = 78^\circ$
 Prove: $\angle A = 72^\circ$



Statement	Reason
1. \overline{DE} is a midsegment in $\triangle ABC$	1. Given
2. $\overline{DE} \parallel \overline{BC}$	2. Midsegments are parallel to the base
3. $\angle B = \angle ADE$	3. Corresponding angles are congruent
4. $\angle B = 78^\circ$	4. Given
4. $\angle ADE = 78^\circ$	5. Transitive property of congruence
5. $\angle A + \angle ADE + \angle AED = 180^\circ$	6. All angles sum to 180° in a triangle
6. $\angle AED = 30^\circ$	7. Given
8. $\angle A + 78^\circ + 30^\circ = 180^\circ$	8. Substitution property of equality
9. $\angle A + 108^\circ = 180^\circ$	9. Substitution property of equality
10. $\angle A = 72^\circ$	10. Subtraction property of equality