

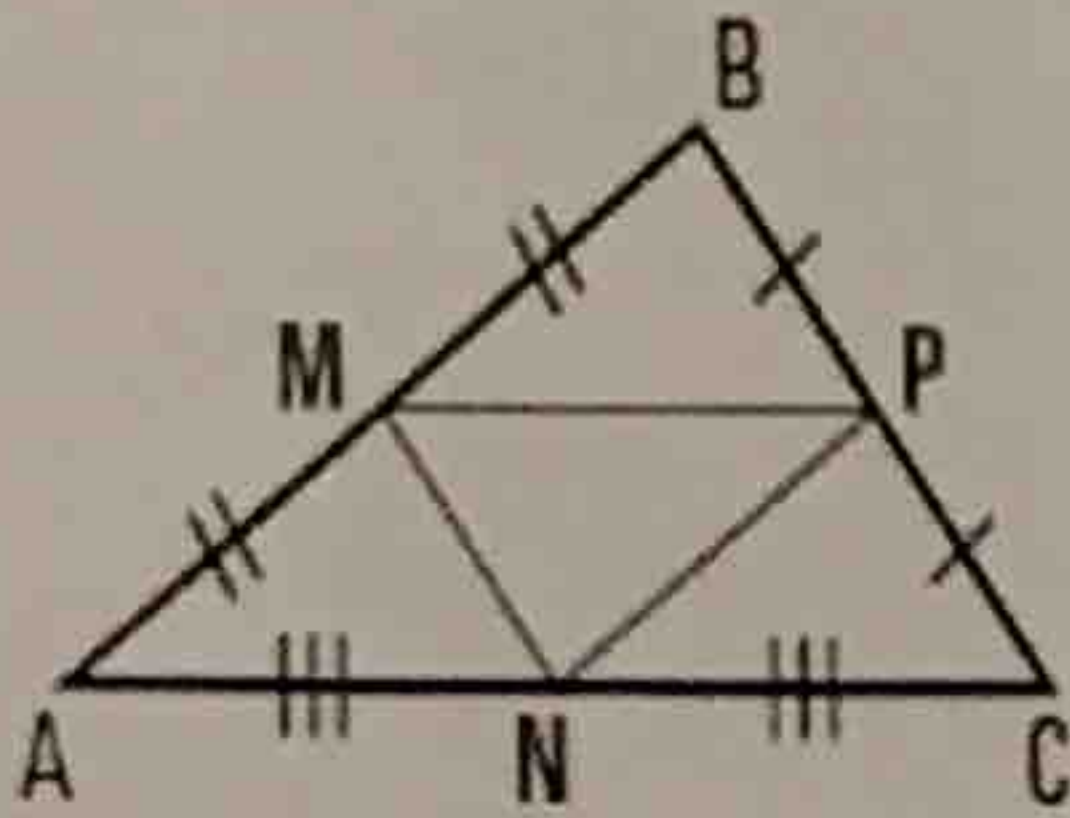
Notes – Midsegments	Name: Key
Standard:	Hour:

Objective: I know what a midsegment of a triangle is and its properties related to parallel segments and length.

Definition

A **Midsegment** connects the midpoints of 2 sides of a polygon. Every triangle has 3 midsegments.

Examples



1. Name the 3 midsegments

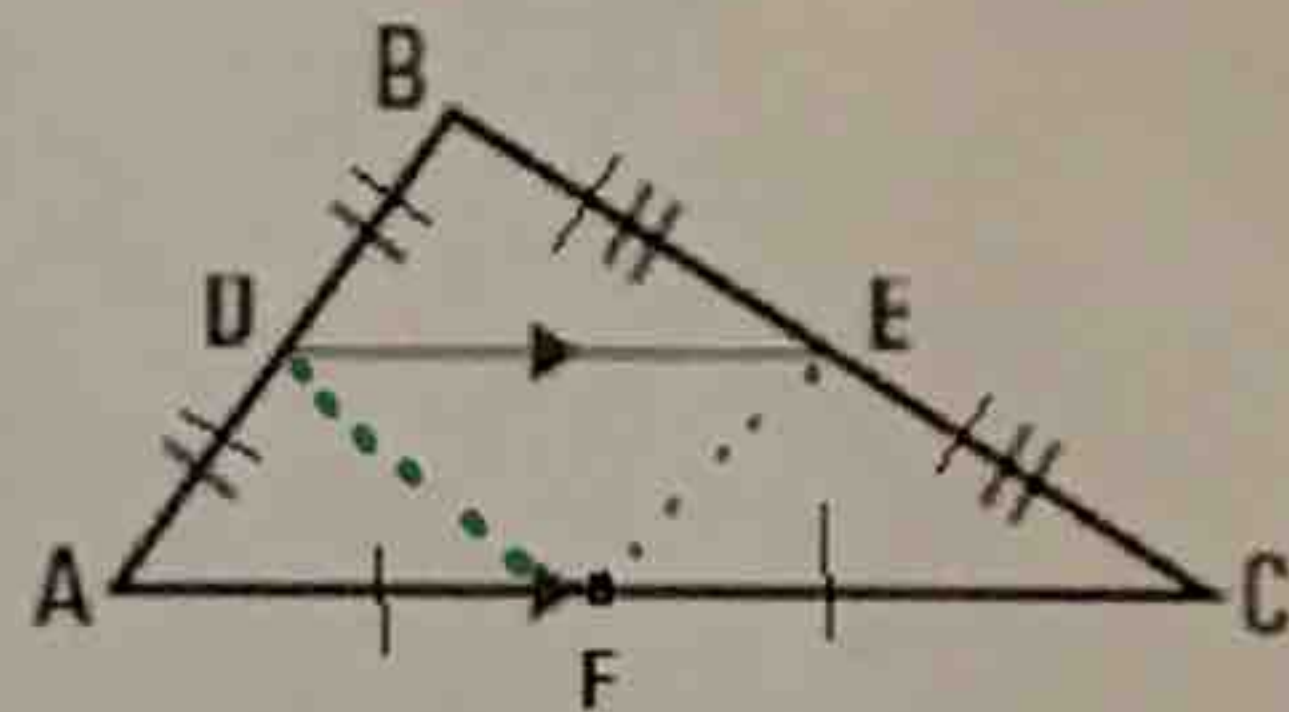
**MP
MN
NP**

2. List the congruent segments

**BP ≅ CP
NA ≅ NC
MB ≅ MA**

Theorem

A midsegment of a triangle is **Parallel** to the third side and **1/2** the length of the third side.



Examples

Use the diagram in the theorem box. Assume F to be the midpoint of segment AC.

3. Write the ~~3~~ parallel statements using each midsegment.

DE // AC

4. Complete each congruence statement.

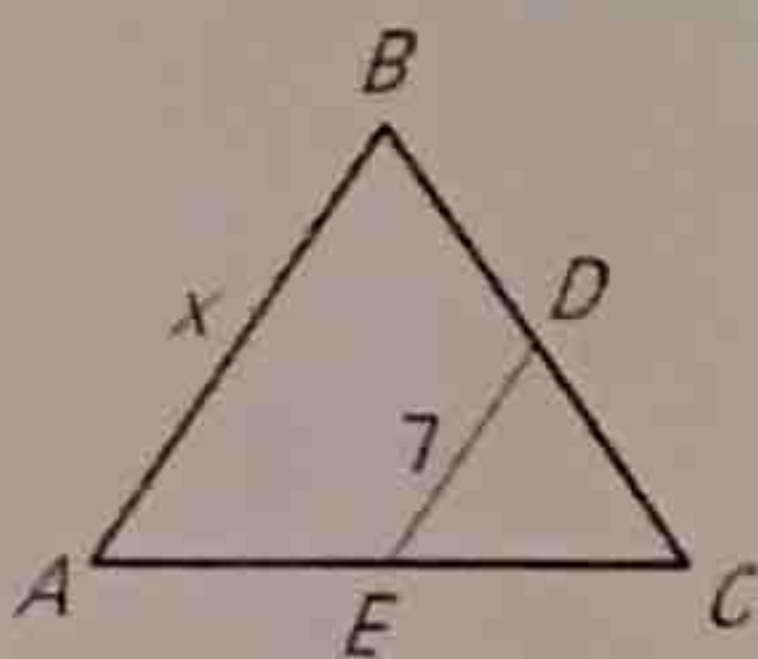
$\overline{DE} \cong \frac{1}{2} \overline{AC} \cong \underline{AF = CF}$

$\overline{FE} \cong \frac{1}{2} \overline{AB} \cong \underline{AD = BD}$

$\overline{DF} \cong \frac{1}{2} \overline{CB} \cong \underline{CE = BE}$

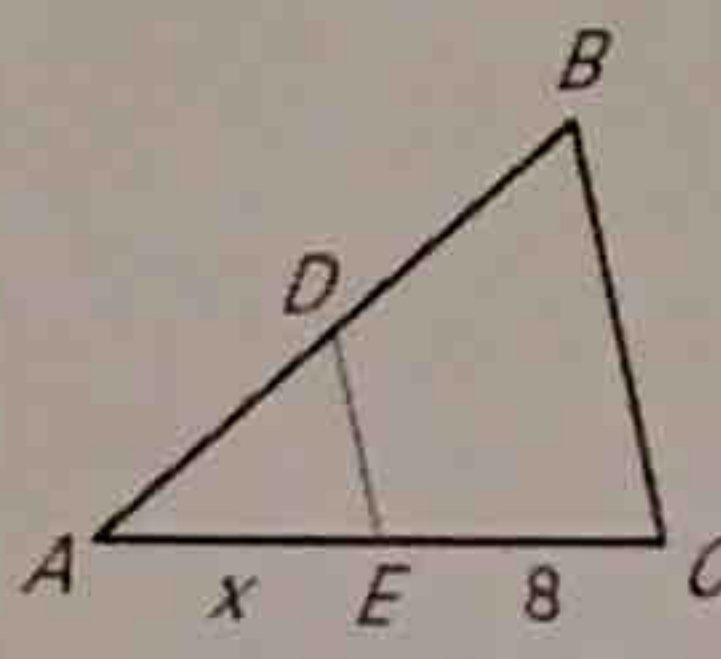
\overline{DE} is the midsegment of $\triangle ABC$. Find the value of x.

5.



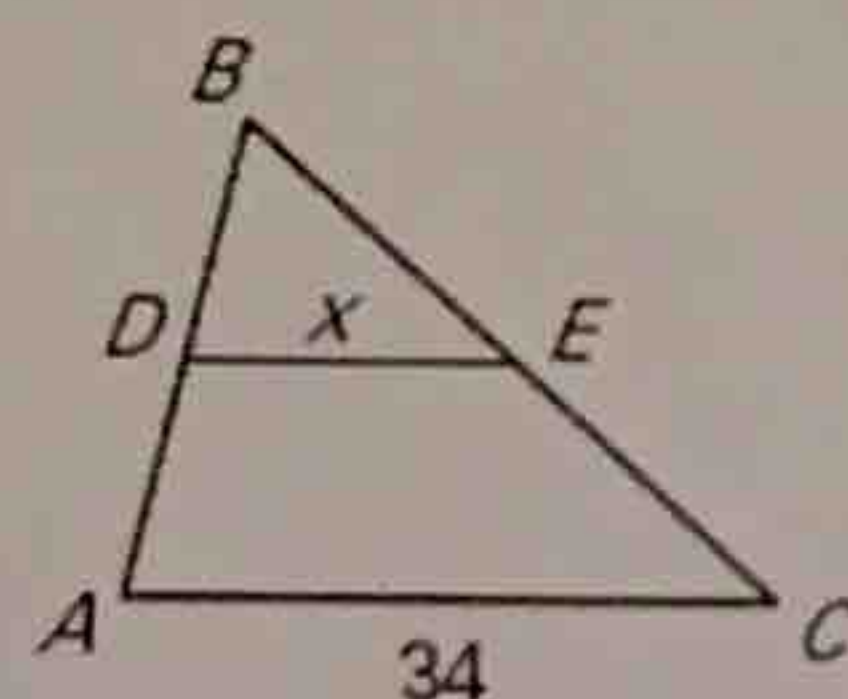
**$7 = \frac{1}{2}x$
 $14 = x$**

6.



**$AE \cong EC$
 $x = 8$**

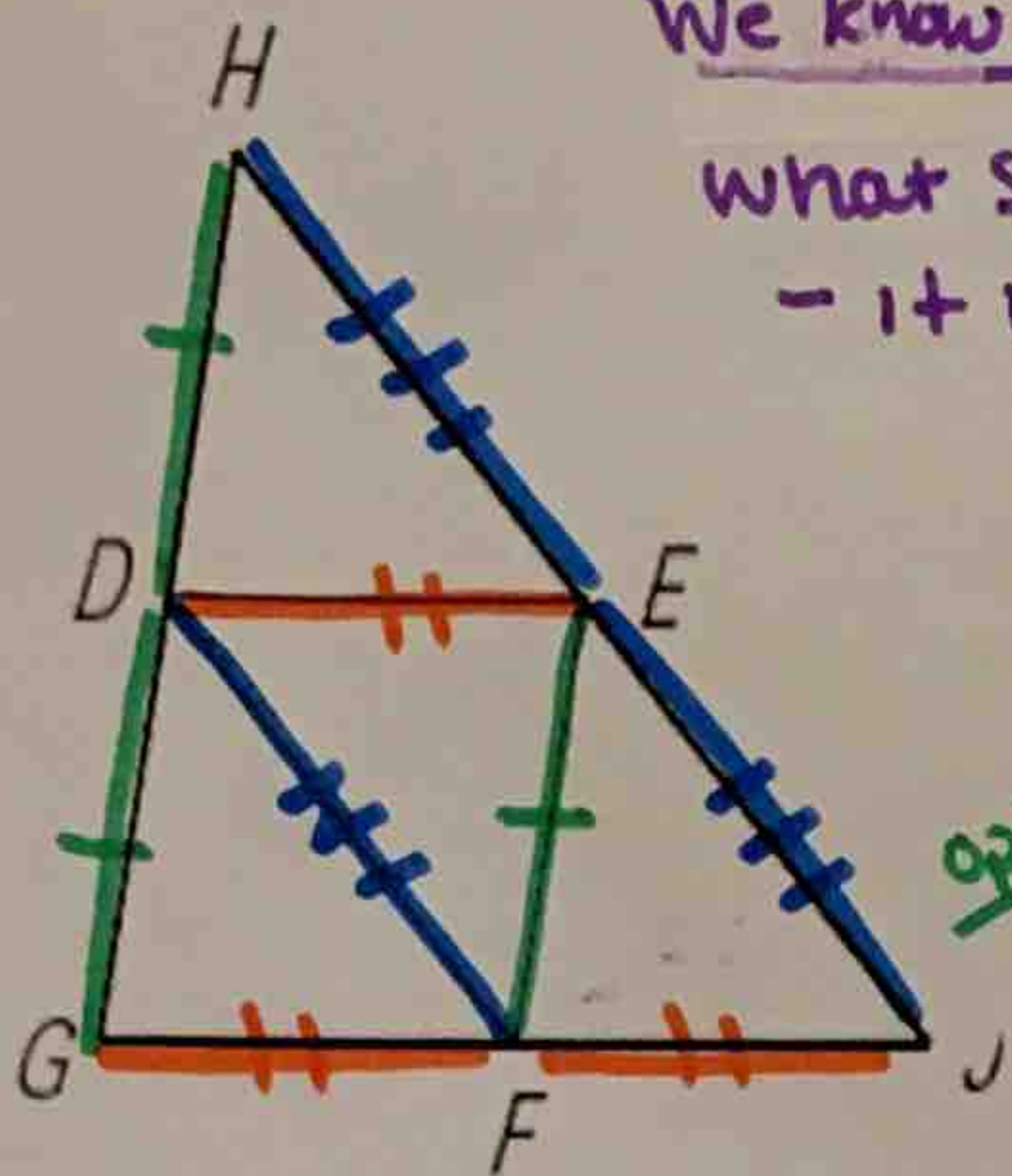
7.



**$x = \frac{1}{2}34$
 $x = 17$**

Practice

Use the diagram for the next 4 problems. D, E, and F are midpoints.



8. If $DE = 4x + 5$ and $GJ = 3x + 25$, find DE

We know: $\textcircled{A} DE = \frac{1}{2} GJ$ or $\textcircled{B} DE = GF$ or $\textcircled{C} DE = FJ$
 $\textcircled{D} GF = JF$
 What should we use?

- it is based on what we are given.
 We are given DE and GJ so use
 Option A $DE = \frac{1}{2} GJ$

$$4x + 5 = \frac{1}{2}(3x + 25)$$

$$4x + 5 = 1.5x + 12.5$$

$$-1.5x \quad -1.5x$$

$$2.5x + 5 = 12.5$$

$$-5 \quad -5$$

$$2.5x = 7.5$$

$$\frac{2.5x}{2.5} = \frac{7.5}{2.5}$$

$$x = 3.75$$

Plug in for DE = $4(3.75) + 5$

$$DE = 20$$

9. If $EF = 2x + 7$ and $GH = 5x - 1$, find EF.

options

$EF = \frac{1}{2} GH$ $EF = DG$ $EF = DH$
 or $DG = DH$

$$2x + 7 = \frac{1}{2}(5x - 1)$$

$$2x + 7 = 2.5x - 0.5$$

$$-2x \quad -2x$$

$$7 = 0.5x - 0.5$$

$$7.5 = 0.5x$$

$$x = 15$$

$$EF = 2(15) + 7$$

$$EF = 37$$

10. If $HJ = 8x - 2$ and $DF = 2x + 11$, find HE.

options:

$DF = \frac{1}{2} HJ$ $DF = EJ$ $DF = EH$
 or $EH = EJ$

$$2x + 11 = \frac{1}{2}(8x - 2)$$

$$2x + 11 = 4x - 1$$

$$11 = 2x - 1$$

$$12 = 2x$$

$$6 = x$$

$HE = \frac{1}{2} HJ$ or $HE = DF$
 Both work

$$HE = 2(6) + 11$$

$$HE = 23$$

11. If $HD = 3x + 29$ and $DG = 14x + 7$, find EF.

options

$EF = \frac{1}{2} HG$, $EF = HD$, $EF = DG$
 or $HD = DG$

$$3x + 29 = 14x + 7$$

$$29 = 11x + 7$$

$$22 = 11x$$

$$2 = x$$

Find EF: $EF = HD$ or $EF = DG$
 Both work!

$$EF = 3(2) + 29$$

$$EF = 35$$