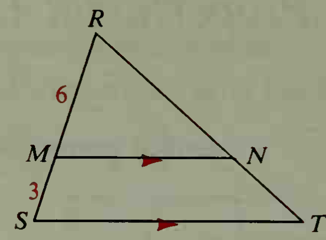
Example Find the numerical value.

a. $\dfrac{TN}{NR}$ b. $\dfrac{TR}{NR}$ c. $\dfrac{RN}{RT}$



Solution

a. $\dfrac{TN}{NR} = \dfrac{SM}{MR} = \dfrac{3}{6} = \dfrac{1}{2}$

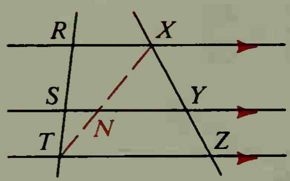
b. $\dfrac{TR}{NR} = \dfrac{SR}{MR} = \dfrac{9}{6} = \dfrac{3}{2}$

c. $\dfrac{RN}{RT} = \dfrac{RM}{RS} = \dfrac{6}{9} = \dfrac{2}{3}$

Compare the following corollary with Theorem 5-9 on page 177.

Corollary

If three parallel lines intersect two transversals, then they divide the transversals proportionally.



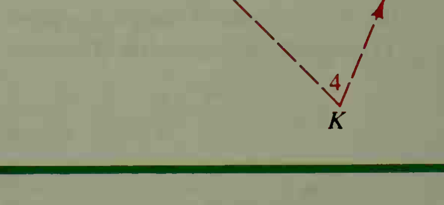
Given: $\overleftrightarrow{RX} \parallel \overleftrightarrow{SY} \parallel \overleftrightarrow{TZ}$

Prove: $\dfrac{RS}{ST} = \dfrac{XY}{YZ}$

Plan for Proof: Draw $\overline{TX}$, intersecting $\overleftrightarrow{SY}$ at N. Note that $\overleftrightarrow{SY}$ is parallel to one side of $\triangle RTX$, and also to one side of $\triangle TXZ$. You can apply the Triangle Proportionality Theorem to both of these triangles. Use those proportions to show $\dfrac{RS}{ST} = \dfrac{XY}{YZ}$.

Theorem 7-4 *Triangle Angle-Bisector Theorem*

If a ray bisects an angle of a triangle, then it divides the opposite side into segments proportional to the other two sides.



Given: $\triangle DEF$; $\overrightarrow{DG}$ bisects $\angle FDE$.

Prove: $\dfrac{GF}{GE} = \dfrac{DF}{DE}$

Plan for Proof: Draw a line through E parallel to $\overrightarrow{DG}$ and intersecting $\overrightarrow{FD}$ at K. Apply the Triangle Proportionality Theorem to $\triangle FKE$. $\triangle DEK$ is isosceles with $DK = DE$. Substitute this into your proportion to complete the proof.