need a calculator + textbook

Warm Up:

If a ship had 26 sheep and 10 goats onboard, how old is the ship's captain?

Objective: Explore Triangle Proportionality Theorem

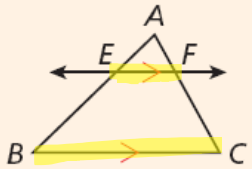
Artists use mathematical techniques to make 2-D paintings appear 3-D. The invention of *perspective* was based on the observation that far away objects look smaller and
closer objects look larger.

Mathematical theorems like the Triangle Proportionality Theorem are important in making perspective drawings.

Exploration

- Do pg. 881 (A – E)

[redacted] Triangle Proportionality Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.	 $\overline{EF} \parallel \overline{BC}$	$\frac{AE}{EB} = \frac{AF}{FC}$

Given: $\overline{EF} \parallel \overline{BC}$ Prove: $\frac{AE}{EB} = \frac{AF}{FC}$

① $\angle A \cong \angle A$ Reflexive Property
$\angle AEF \cong \angle ABC$ corresponding angles
$\triangle ABC \sim \triangle AEF$ by AA~

② $\frac{AB}{AE} = \frac{AC}{AF}$ (b/c $\triangle$ are ~)

$\frac{AE+EB}{AE} = \frac{AF+FC}{AF}$ $\frac{2+3}{4} = \frac{2}{4}+\frac{3}{4}$

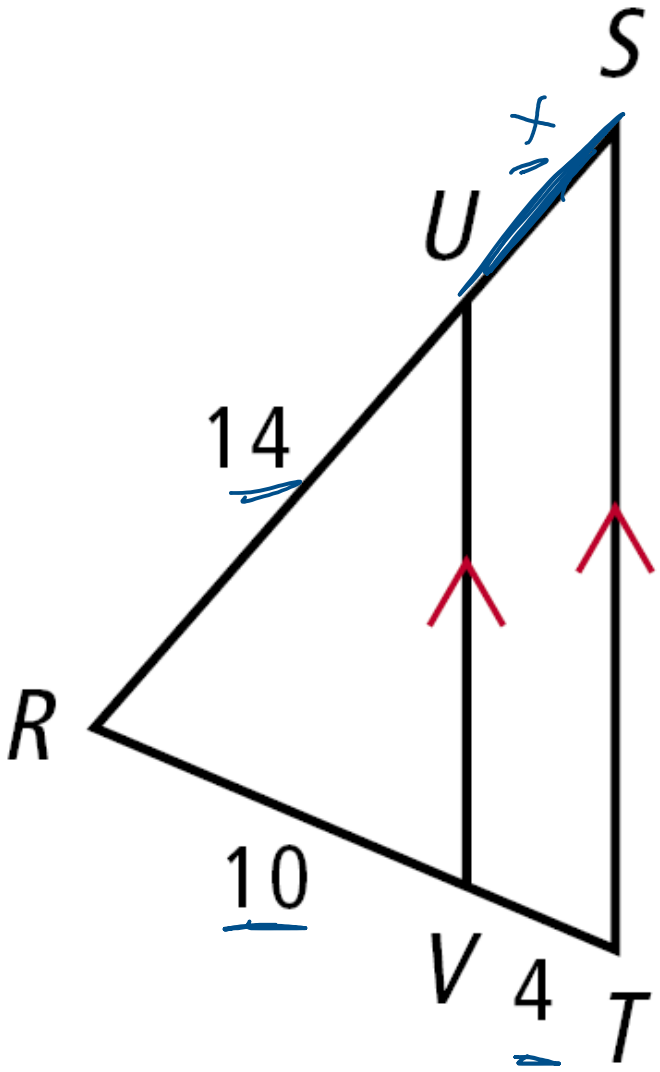
③ $\frac{AE}{AE} + \frac{EB}{AE} = \frac{AF}{AF} + \frac{FC}{AF}$

$1 + \frac{EB}{AE} = 1 + \frac{FC}{AF}$

$\frac{EB}{AE} = \frac{FC}{AF}$

$\frac{AE}{EB} = \frac{AF}{FC}$ ✓

Find *US*.



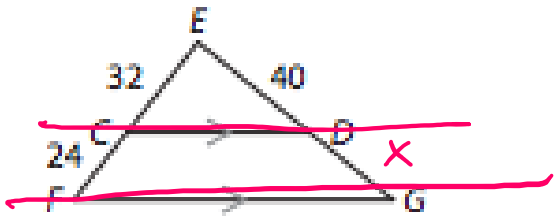
$\frac{10}{4} = \frac{14}{x}$

$x = 5.6$

Do pg. 884 (5 and 6)

$\frac{32}{24} = \frac{40}{x}$

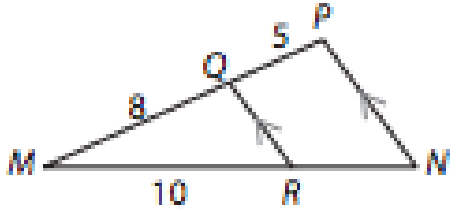
5. $\overline{DG}$



$\frac{EC}{CF} = \frac{ED}{DG}; \frac{32}{24} = \frac{40}{DG}; \frac{24}{32} = \frac{DG}{40};$

$40\left(\frac{24}{32}\right) = DG; DG = \frac{960}{32} = 30$

6. $\overline{RN}$

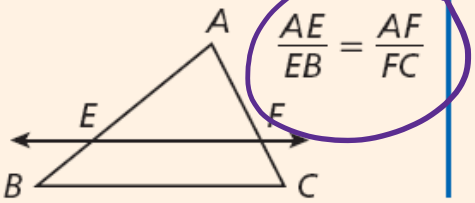


$\frac{MR}{RN} = \frac{MQ}{QP}; \frac{10}{RN} = \frac{8}{5}; \frac{RN}{10} = \frac{5}{8}; RN = \left(\frac{5}{8}\right)10$

$RN = \frac{50}{8} = \frac{25}{4}$ or $6\frac{1}{4}$

$\frac{8}{5} = \frac{10}{x}$

Theorem 7-4-2 Converse of the Triangle Proportionality Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If a line divides two sides of a triangle proportionally, then it is parallel to the third side.		$\overleftrightarrow{EF} \parallel \overline{BC}$

Given: $\frac{AE}{EB} = \frac{AF}{FC}$ Prove: $\overleftrightarrow{EF} \parallel \overline{BC}$

① $\frac{EB}{AE} = \frac{FC}{AF}$

$\frac{AE}{AE} + \frac{EB}{AE} = \frac{AF}{AF} + \frac{FC}{AF}$

$\frac{AE+EB}{AE} = \frac{AF+FC}{AF}$

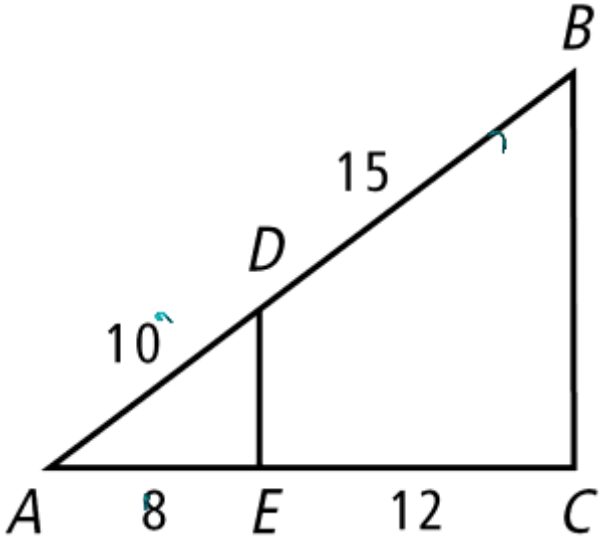
② $\frac{AB}{AE} = \frac{AC}{AF}$ ✓ $\angle A \cong \angle A$ Reflexive Prop.

$\triangle ABC \sim \triangle AEF$ SAS~

③ $\angle AEF \cong \angle ABC$ (b/c $\triangle$s are ~)

$\overleftrightarrow{EF} \parallel \overline{BC}$ Converse of corresponding $\angle$s theorem

Verify that $\overline{DE} \parallel \overline{BC}$

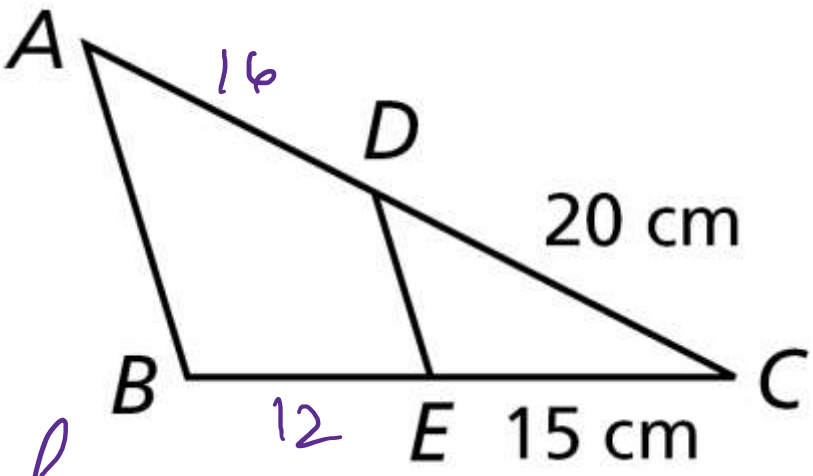


$\frac{8}{12} = \frac{10}{15}$ ✓

by the converse of TPT $\overline{DE} \parallel \overline{BC}$

***AC* = 36 cm, and *BC* = 27**

cm. Verify that $\overline{DE} \parallel \overline{AB}$



$\frac{20}{16} = \frac{15}{12}$ ✓

By the converse of IPT $\overline{DE} \parallel \overline{AB}$

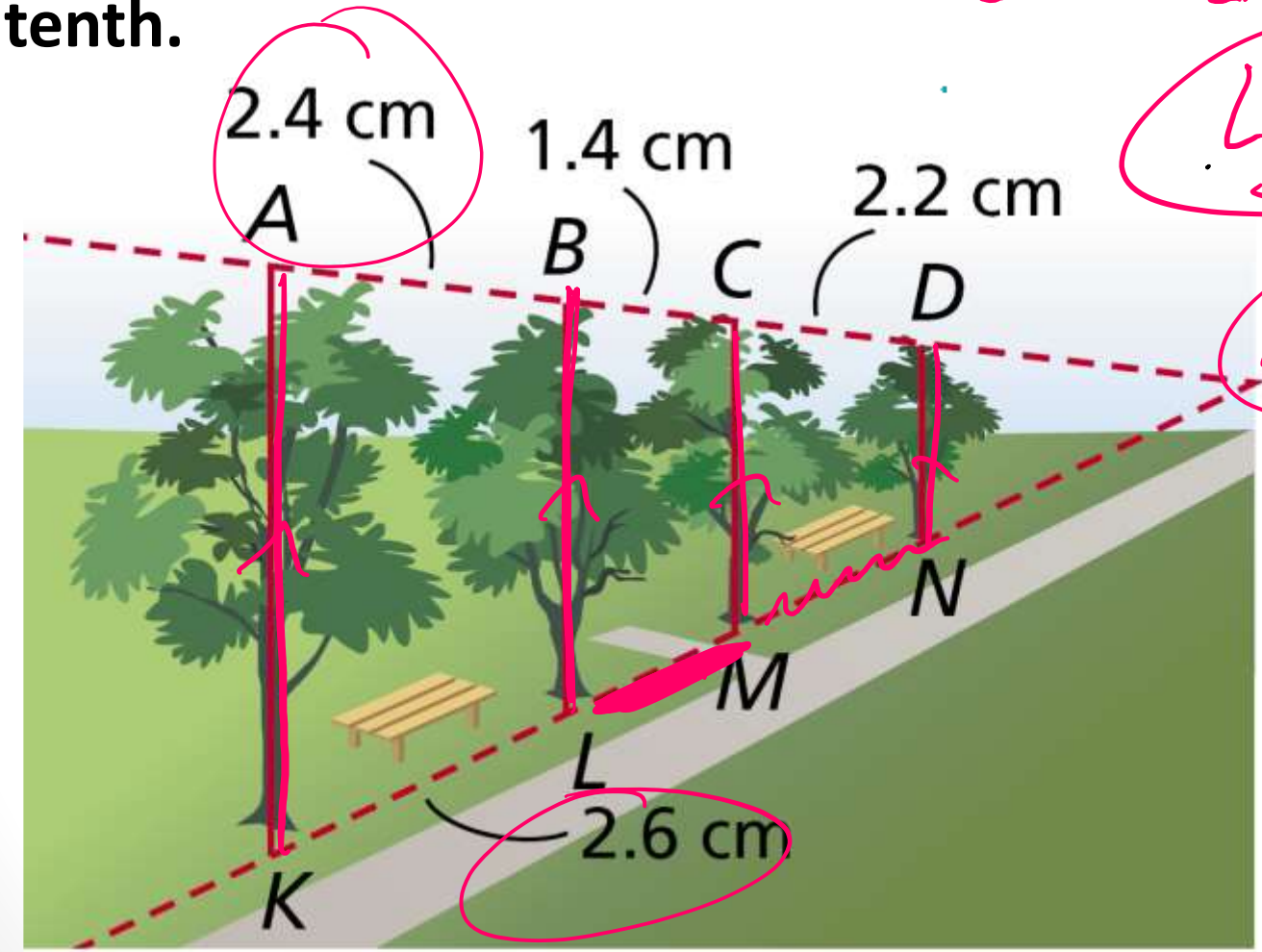
∴

Use the diagram to find *LM* and *MN* to the nearest tenth.

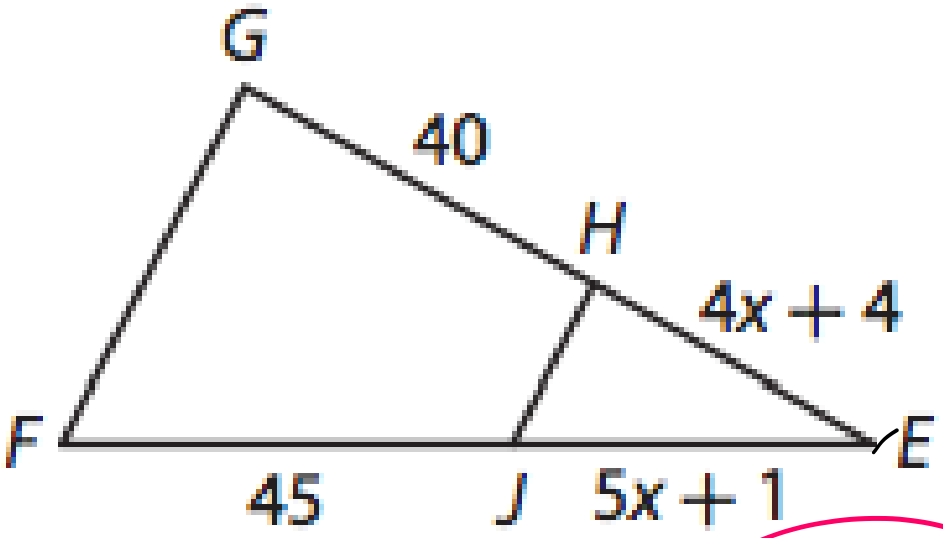
$\frac{2.4}{2.6} = \frac{1.4}{LM}$

$LM = 1.5$

$MN = 2.4$



Algebra For what value of x is $\overline{GF} \parallel \overline{HJ}$?



$x = 7$

pg. 887 (3 – 10)