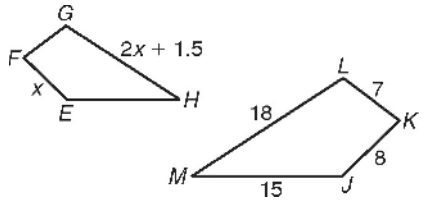
Name _____ Date _____ Class _____

LESSON 8-1

Problem Solving

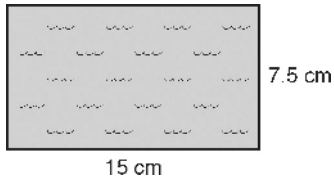
Ratios in Similar Polygons

1. *EFGH* ~ *JKLM.* What is the value of *x*?



2. The ratio of a model scale die cast motorcycle is 1 : 18. The model is $5\frac{1}{4}$ inches long. What is the length of the actual motorcycle in feet and inches?

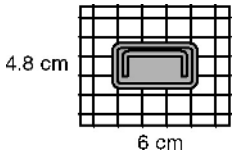
3. A diagram of a new competition swimming pool is shown. If the width of the pool is 25 meters, find the length of the actual pool.



4. Rectangle A has side lengths 16.4 centimeters and 10.8 centimeters. Rectangle B has side lengths 10.25 centimeters and 6.75 centimeters. Determine whether the rectangles are similar. If so, write the similarity ratio.

Choose the best answer.

5. A pet store has various sizes of guinea pig cages. A diagram of the top view of one of the cages is shown. What are possible dimensions of this cage?



A 28 in. by 24 in. C 30 in. by 24 in.

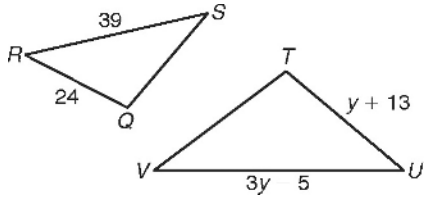
B 28 in. by 18 in. D 30 in. by 18 in.

6. A gymnasium is 96 feet long and 75 feet wide. On a blueprint, the gymnasium is 5.5 inches long. To the nearest tenth of an inch, what is the width of the gymnasium on the blueprint?

F 3.7 in. H 7.0 in.

G 4.3 in. J 13.6 in.

7. △*QRS* ~ △*TUV*. Find the value of *y*.



A 3.6 C 19

B 5.5 D 33

8. △*ABC* has side lengths 14, 8, and 10.4. What are possible side lengths of △*DEF* if △*ABC* ~ △*DEF*?

F 28, 20, 20.8

G 35, 16, 20.8

H 28, 20, 26

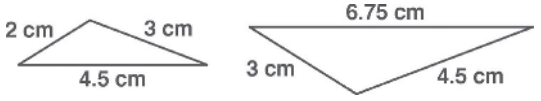
J 35, 20, 26

Practice C

1. Possible answer: It is given that $\triangle DEF$ is the midsegment triangle of $\triangle ABC$. Therefore $\overline{EF}$, $\overline{DF}$, and $\overline{DE}$ are midsegments. By the Triangle Midsegment Theorem,

   $DF = \frac{1}{2}(AC) = AE$ and $DE = \frac{1}{2}(AB) = AF.$

   By the definition of congruent segments, $\overline{DF} \cong \overline{AE}$ and $\overline{DE} \cong \overline{AF}$. $\overline{EF}$ is congruent to itself, so $\triangle AFE$ is congruent to $\triangle DEF$ by SSS. Also by the Triangle Midsegment Theorem, $\overline{EF} \parallel \overline{CB}$. Corresponding angles are congruent, so $\angle AEF \cong \angle C$ and $\angle AFE \cong \angle B$. By CPCTC, $\angle EDF \cong \angle A$, $\angle DEF \cong \angle AFE$, and $\angle DFE \cong \angle AEF$. Then by the Transitive Property, $\angle DEF \cong \angle B$ and $\angle DFE \cong \angle C$. So the corresponding angles of $\triangle DEF$ and $\triangle ABC$ are congruent. By the Triangle Midsegment Theorem, $EF = \frac{1}{2}(BC)$ and, as stated earlier, $DF = \frac{1}{2}(AC)$ and $DE = \frac{1}{2}(AB)$.

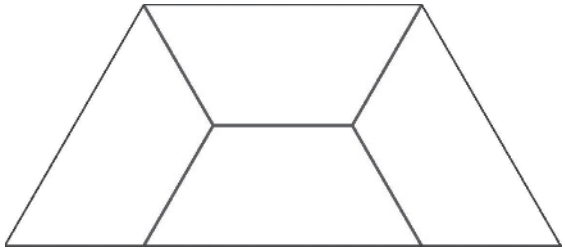
2. 

3. No, they are not congruent because they have different side lengths.
4. Yes, they seem similar. The measures of corresponding angles appear to be the same, and the corresponding sides are all in the ratio $\frac{2}{3}$.
5. three pairs

Reteach

1. $\angle J \cong \angle M$; $\angle K \cong \angle N$; $\angle L \cong \angle P$; $\frac{JK}{MN} = \frac{KL}{NP} = \frac{LJ}{PM} = \frac{4}{3}$
2. $\angle A \cong \angle Q$; $\angle B \cong \angle R$; $\angle C \cong \angle S$; $\angle D \cong \angle T$ $\frac{AB}{QR} = \frac{BC}{RS} = \frac{CD}{ST} = \frac{DA}{TQ} = \frac{1}{2}$
3. yes; $\frac{2}{3}$; $\triangle EFG \sim \triangle HJK$
4. yes; $\frac{1}{3}$; $\square QRST \sim \square UVWX$
5. 2 cm
6. 320
7. 24
8. 8.1
9. 16.8 m
10. 57.5

Challenge



Problem Solving

1. 6
2. 7 ft 10.5 in.
3. 50 m
4. yes; $\frac{8}{5}$ or $\frac{5}{8}$
5. C
6. G
7. C
8. J

Reading Strategies

1. $\angle D \cong \angle S$; $\angle E \cong \angle P$; $\angle F \cong \angle Q$; $\angle G \cong \angle R$
2. $\overline{DE}$ and $\overline{SP}$; $\overline{EF}$ and $\overline{PQ}$; $\overline{FG}$ and $\overline{QR}$; $\overline{DG}$ and $\overline{SR}$
3. $\frac{EF}{PQ}; \frac{FG}{QR}; \frac{DG}{SR}$
4. $\frac{9}{6}; \frac{6}{4}; \frac{3}{2}; \frac{9}{6}$
5. All the ratios simplify to $\frac{3}{2}$.
6. The side lengths are proportional.
7. The ratio would simplify to 1 : 1.