NAME Ms. Kresovic

Adv Geo **Similar Polygons (ch 8) Review** DATE

Concepts and Procedures

After studying this chapter, you should be able to

- Recognize and work with ratios (8.1)
- Recognize and work with proportions (8.1)
- Apply the product and ratio theorems (8.1)
- Calculate geometric means (8.1)
- Identify the characteristics of similar figures (8.2)
- Use several methods to prove that triangles are similar (8.3)
- Use the concept of similarity to establish the congruence of angles and the proportionality of segments (8.4)
- Solve shadow problems (8.4)
- Apply three theorems frequently used to establish proportionality (8.5)

TEST TOMORROW! (1-27, w)

Vocabulary

HAND THIS IN :)

arithmetic mean (8.1)
dilation (8.2)
extremes (8.1)
geometric mean (8.1)
mean proportion (8.1)
mean proportional (8.1)
means (8.1)
proportion (8.1)
ratio (8.1)
reduction (8.2)
rise (8.1)
run (8.1)
similar (8.2)
similar polygons (8.2)

This is a selection of material covered in chapter 8, but may not be all inclusive. Please review thoroughly, using the above vocab and concepts as a guide, as well as homework and the quiz.

Problem Set A

→ b & c → a & d

1 Identify the means and the extremes in the proportion $\frac{a}{b} = \frac{c}{d}$.

2 Find the fourth proportional to 4, 6, and 8.

3 Find the mean proportionals between 5 and 20.

4 Find the geometric means between 3 and 6.

5 If $9x = 4y$, find the ratio of x to y.

$\frac{9x}{9y} = \frac{4y}{9y} \rightarrow \frac{x}{y} = \frac{4}{9}$

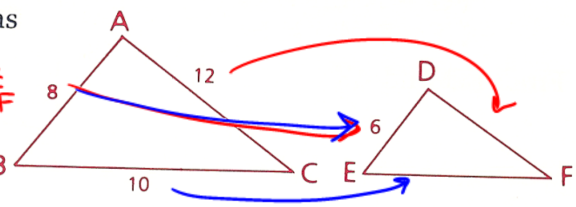
6 Given: $\triangle ABC \sim \triangle DEF$, with lengths as shown

Find: DF and EF

$\frac{8}{6} = \frac{12}{DF}$, $\frac{4}{3} = \frac{12}{DF}$

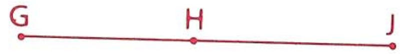
$DF = 9$

$\frac{4}{3} = \frac{10}{EF}$, $4EF = 30$, $EF = 15/2$



7 Pentagon ABCDE is similar to pentagon A′B′C′D′E′. The pentagons' respective perimeters are 24 and 30. If AB = 6, find A′B′.

8 If $\frac{GH}{HJ} = \frac{3}{4}$ and GJ = 56, find HJ.

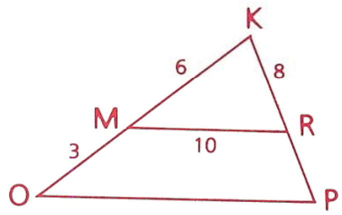


9 If $\frac{r}{3x} = \frac{a}{2b}$, what is the value of x in terms of a, b, and r?

10 A radio antenna that is 100 m tall casts an 80-m shadow. At the same time, a nearby telephone pole casts a 16-m shadow. Find the height of the telephone pole.

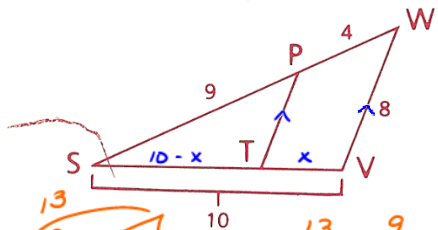
11 Given: $\overleftrightarrow{MR} \parallel \overleftrightarrow{OP}$,
lengths as shown

Find: RP and OP

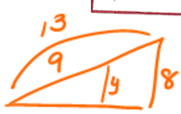


12 Given: $\overleftrightarrow{TP} \parallel \overleftrightarrow{VW}$, lengths as shown Side splitter

Find: ST, TV, and PT



$\frac{SP}{ST} = \frac{PW}{TV}$, $\frac{9}{10-x} = \frac{4}{x}$, $9x = 40-4x$
$13x = 40$
$x = 40/13 = TV$

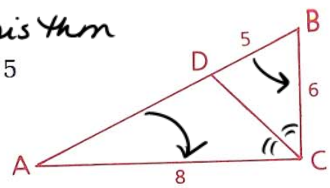


$\frac{13}{8} = \frac{9}{y} \rightarrow 13y = 72$
$\boxed{y = \frac{72}{13}}$

$ST = 10 - \frac{40}{13} \rightarrow \frac{130}{13} - \frac{40}{13} = \frac{90}{13}$

13 Given: $\overrightarrow{CD}$ bisects ∠ACB. ∠bis thm
AC = 8, BC = 6, BD = 5

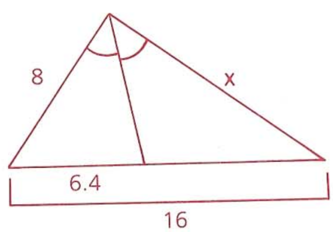
Find: AD



$\frac{5}{6} = \frac{AD}{8}$, $AD = \frac{40}{6}$ or $\frac{20}{3}$

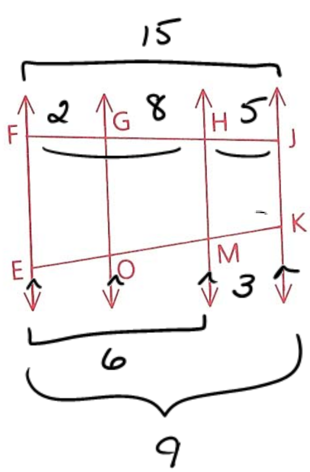
14 Given: Diagram as shown

Find: x



16 Given: $\overleftrightarrow{EF} \parallel \overleftrightarrow{GO} \parallel \overleftrightarrow{HM} \parallel \overleftrightarrow{JK}$,
FG = 2, GH = 8,
HJ = 5, EM = 6

Find: EO and EK =9



$\frac{HJ}{FH} = \frac{KM}{EM} \Rightarrow \frac{5}{10} = \frac{KM}{6} \Rightarrow \frac{1}{2} = \frac{KM}{6} \Rightarrow KM = 3$

$\frac{FG}{FH} = \frac{EO}{EM} \Rightarrow \frac{2}{10} = \frac{EO}{6} \Rightarrow \frac{1}{5} = \frac{EO}{6}$

$5EO = 6 \Rightarrow EO = 6/5$

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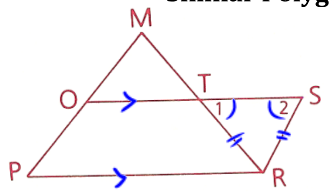
17 Given: $\overline{OS} \parallel \overline{PR}$, $\angle 1 \cong \angle 2$

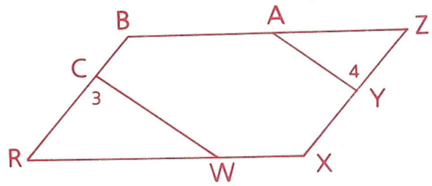
Prove: $\frac{MO}{OP} \cong \frac{MT}{SR}$



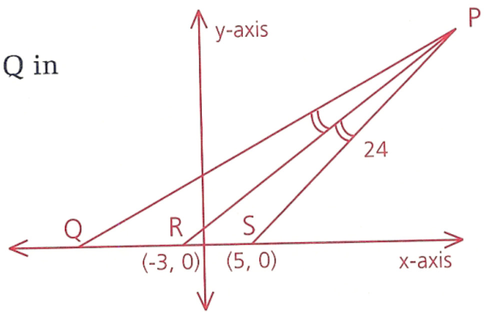
1. $\overline{OS} \parallel \overline{RP}$ — 1. GIVEN
2. $\frac{MO}{OP} = \frac{MT}{TR}$ — 2. SIDE SPLITTER
3. $\angle 1 \cong \angle 2$ — 3. GIVEN
4. $\overline{TR} \cong \overline{SR}$ — 4. △ ⇒ △
5. $MO/OP = MT/SR$ — 5. Substitute

18 Given: BRXZ is a ▱. $\angle 3 \cong \angle 4$

Prove: (RC) (ZA) = (ZY) (RW)



19 If PQ = 30, find the coordinates of Q in the diagram. (−13, 0)



Problem Set B

20 Indicate whether the statement is true Always, Sometimes, or Never (A, S, or N)

A **a** Two isosceles triangles are similar if a base angle of one is congruent to a base angle of the other.

A **b** Two isosceles triangles are similar if the vertex angle of one is congruent to the vertex angle of the other. 80 80 50 50

N **c** An equilateral triangle is similar to a scalene triangle. 60°

S **d** If two sides of one triangle are proportional to two sides of another triangle, the triangles are similar. 1 3 4 12 Need∠

N **e** In △ABC, ∠A = 40°, AB = 6, and BC = 8. In △RST, RS = 12, ST = 16, and ∠R = 80°. Therefore, △ABC ~ △RST. 6 8 40° B A C

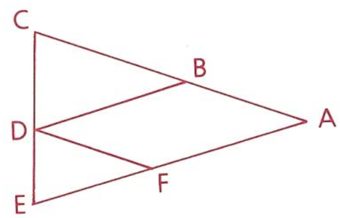
A **f** If a line intersects a side of a triangle at one of its trisection points and is parallel to a second side, then it intersects the third side at one of its trisection points.

A **g** Two right triangles are similar if the legs of one are proportional to the legs of the other. 3 5 6 10 SAS~

h If the ratio of the measures of a pair of corresponding sides of two polygons is 3:4, then the ratio of the polygons' perimeters is 5:6.

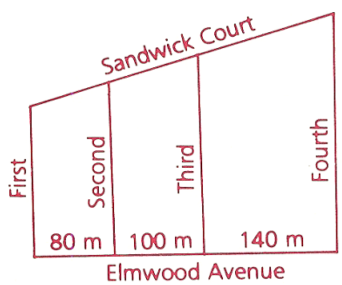
N RATIO sides $\frac{a}{b}$ Ratio areas $\frac{a^2}{b^2}$

21 Given: ABDF is a ▱.
Conclusion: $\triangle CBD \sim \triangle DFE$



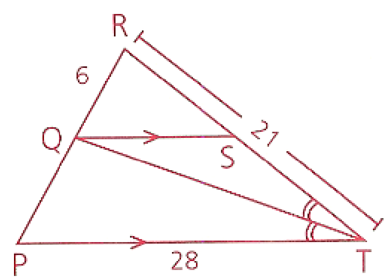
26 If $\frac{7}{x + 4y} = \frac{9}{2x - y}$, find the ratio of x to y.

28 The diagram shows a part of the town of Oola, La. First, Second, Third, and Fourth streets are each perpendicular to Elmwood Avenue. If the total frontage on Sandwick Court is 400 m, find the length of each block of Sandwick Court.



Problem Set C

29 Given: $\overrightarrow{TQ}$ bisects $\angle RTP$.
$\overleftrightarrow{QS} \parallel \overleftrightarrow{PT}$
Find: QP, RS, and QS.



AMDG

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1 b and c are the means, a and d the extremes.

2 $\frac{4}{6} = \frac{8}{x}$
$4x = 48$
$x = 12$

3 $\frac{5}{x} = \frac{x}{20}$
$x^2 = 100$
$x = \pm 10$

4 $\frac{3}{x} = \frac{x}{6}$
$x^2 = 18$
$x = \sqrt{18} \approx 4.24$

5 $9x = 4y$
$x = \frac{4y}{9}$
$\frac{x}{y} = \frac{4}{9}$

6 Since corr sides of ~ $\triangle$s are prop,
$\frac{8}{6} = \frac{10}{EF}$ $\frac{8}{6} = \frac{12}{DF}$
$8(EF) = 60$ $8(DF) = 72$
$EF = \frac{60}{8} = \frac{15}{2}$ $DF = 9$

7 $\frac{24}{30} = \frac{6}{x}$
$\frac{4}{5} = \frac{6}{x}$
$(4x) = (30)$
$x = 7\frac{1}{2}$ or $\frac{15}{2}$
$A'B' = 7\frac{1}{2}$ or $\frac{15}{2}$

8 $HJ = 56 - x$
$\frac{3}{4} = \frac{x}{56 - x}$
$3(56 - x) = 4x$
$168 - 3x = 4x$
$168 = 7x$
$24 = x$
$HJ = 56 - 24 = 32$

9 $2br = 3xa$
$\frac{2br}{3a} = x$

10 $\frac{100}{80} = \frac{x}{16}$
$80x = 1600$
$x = 20$
pole is 20 m.

11 $\frac{KM}{KR} = \frac{MO}{RP}$ $\frac{KM}{MR} = \frac{KO}{OP}$
$\frac{6}{8} = \frac{3}{RP}$ $\frac{6}{10} = \frac{9}{OP}$
$6(RP) = 24$ $6(OP) = 90$
$RP = 4$ $OP = 15$

12 $\frac{9}{9+4} = \frac{ST}{10}$ $\frac{4}{9+4} = \frac{TV}{10}$ $\frac{9}{PT} = \frac{9+4}{8}$
$\frac{9}{13} = \frac{ST}{10}$ $\frac{4}{13} = \frac{TV}{10}$ $\frac{9}{PT} = \frac{13}{8}$
$90 = 13(ST)$ $13(TV) = 40$ $13(PT) = 72$
$ST = \frac{90}{13}$ $TV = \frac{40}{13}$ $PT = \frac{72}{13}$

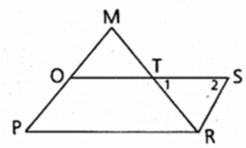
13 $\frac{6}{5} = \frac{8}{AD}$
$6(AD) = 40$
$AD = \frac{40}{6}$
$AD = \frac{20}{3}$

14 $\frac{9.6}{6.4} = \frac{x}{8}$
$6.4x = 76.8$
$x = 12$

15 $\frac{1}{570} = \frac{18.5}{x}$
$x = 10{,}545$ in.
$\frac{10\,545 \text{ in.}}{12 \text{ in./ft}} \approx 879$ ft

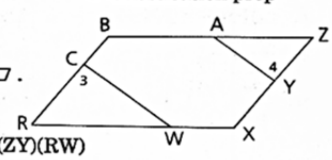
16 $2x + 8x = 6$ $\frac{FJ}{FG} = \frac{EK}{EO}$
$10x = 6$ $\frac{15}{2} = \frac{y}{\frac{6}{5}}$
$x = \frac{6}{10} = \frac{3}{5}$ $2y = \frac{6}{5}(15)$
$EO = 2x$ $2y = 18$
$EO = \frac{6}{5}$ $y = 9, EK = 9$

17 Given: $\overline{OS} \parallel \overline{PR}$
$\angle 1 \cong \angle 2$
Prove: $\frac{MO}{OP} = \frac{MT}{SR}$



1 $\overline{OS} \parallel \overline{PR}$	1 Given
2 $\angle 1 \cong \angle 2$	2 Given
3 $\overline{TR} \cong \overline{SR}$	3 If $\triangle$ then $\triangle$
4 $\frac{MO}{OP} = \frac{MT}{TR}$	4 A line $\parallel$ to side of $\triangle$ and intersects other sides divides sides prop
5 $\frac{MO}{OP} = \frac{MT}{SR}$	5 Substitution prop

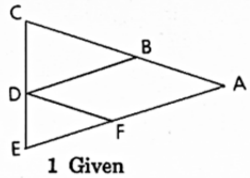
18 Given: BRXZ is a $\square$.
$\angle 3 \cong \angle 4$
Prove: $(RC)(ZA) = (ZY)(RW)$



1 BRXZ is a $\square$.	1 Given
2 $\angle 3 \cong \angle 4$	2 Given
3 $\angle R \cong \angle Z$	3 In a $\square$ opp $\angle$s are $\cong$.
4 $\triangle RCW \sim \triangle ZYA$	4 AA~
5 $\frac{RC}{ZY} = \frac{RW}{ZA}$	5 Corr sides of ~ $\triangle$s are prop.
6 $(RC)(ZA) = (ZY)(RW)$	6 Means-Extremes Products Theorem

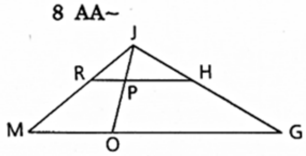
19 $\frac{RS}{RQ} = \frac{PS}{PQ}$
$\frac{8}{RQ} = \frac{24}{30}$
$24RQ = 240$
$RQ = 10$
$Q = (-13, 0)$

20 a A b A
c N d S
e N f A
g A h S



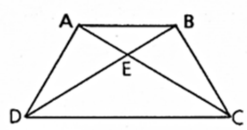
21 Given: ABDF is a ▱. Concl: $\triangle CBD \sim \triangle DFE$

1 ABDF is a ▱.	1 Given
2 $\overline{CA} \parallel \overline{DF}$	2 In a ▱ opp sides ∥.
3 $\angle C \cong \angle EDF$	3 ∥ lines ⇒ corr ∠s ≅.
4 $\angle ABD \cong \angle DFA$	4 In a ▱ opp ∠s ≅.
5 $\angle EFD$ supp of $\angle DFA$	5 Supp ∠s form a st ∠.
6 $\angle CBD$ supp of $\angle ABD$	6 Same as 5
7 $\angle EFD \cong \angle CBD$	7 Supps of ≅ ∠s are ≅.
8 $\triangle CBD \sim \triangle DFE$	8 AA~



22 Given: $\overleftrightarrow{HR} \parallel \overleftrightarrow{GM}$ Prove: $\frac{PR}{OM} = \frac{PH}{OG}$

1 $\overleftrightarrow{HR} \parallel \overleftrightarrow{GM}$	1 Given
2 $\angle RJP \cong \angle RJP$	2 Reflexive prop
3 $\angle JPR \cong \angle JOM$	3 ∥ lines ⇒ corr ∠s ≅.
4 $\triangle JRP \sim \triangle JMO$	4 AA~
5 $\frac{RP}{MO} = \frac{JP}{JO}$	5 Corr sides of ~ △s prop.
6 $\angle JPH \cong \angle JOG$	6 ∥ lines ⇒ corr ∠s ≅.
7 $\angle PJH \cong \angle PJH$	7 Reflexive prop
8 $\triangle JPH \sim \triangle JOG$	8 AA~
9 $\frac{JP}{JO} = \frac{PH}{OG}$	9 Corr sides of ~ △s prop.
10 $\frac{PR}{OM} = \frac{PH}{OG}$	10 Substitution prop



23 Given: ABCD is a trap. Prove: $\frac{AE}{CE} = \frac{BE}{DE}$

1 ABCD is a trap.	1 Given
2 $\overline{AB} \parallel \overline{DC}$	2 A trap is a quad with one pair of ∥ sides.
3 $\angle BAE \cong \angle DCE$	3 ∥ lines ⇒ alt int ∠s ≅.
4 $\angle AEB \cong \angle CED$	4 Vert ∠s ≅.
5 $\triangle AEB \sim \triangle CED$	5 AA~
6 $\frac{AE}{CE} = \frac{BE}{DE}$	6 Corr sides ~ △s prop.

24
$$3x + 5x + 7x = 78$$
$$15x = 78$$
$$x = \tfrac{78}{15} \text{ or } \tfrac{26}{5}$$
$$3x = 3(\tfrac{26}{5}) = \tfrac{78}{5}$$
$$7x = 7(\tfrac{26}{5}) = \tfrac{182}{5}$$
$$\tfrac{78}{5} + \tfrac{182}{5} = \tfrac{260}{5} = 52$$

25
$$\frac{x-4}{4} = \frac{x}{6}$$
$$6x - 24 = 4x$$
$$2x = 24$$
$$x = 12$$
$$P = (12 - 4) + (12) + (4 + 6) = 30$$

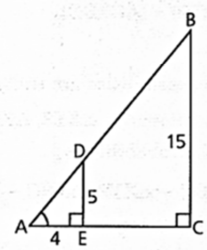
26
$$\frac{7}{x+4y} = \frac{9}{2x-y}$$
$$9x + 36y = 14x - 7y$$
$$43y = 5x$$
$$\frac{x}{y} = \frac{43}{5}$$

27
$$\frac{NP}{PR} = \frac{NT}{TS} \qquad NR = NP + PR \qquad NS = NT + TS$$
$$\frac{5x-21}{5} = \frac{x}{8} \qquad NR = 5(\tfrac{24}{5}) - 21 + 5 \qquad NS = x + 8$$
$$40x - 168 = 5x \qquad NR = 24 - 21 + 5 \qquad NS = \tfrac{24}{5} + 8$$
$$35x = 168 \qquad NR = 8 \qquad NS = \tfrac{64}{5}$$
$$x = \tfrac{24}{5} \qquad NR + NS = \tfrac{40}{5} + \tfrac{64}{5} = \tfrac{104}{5}$$

28
$$80x + 100x + 140x = 400 \qquad 80(\tfrac{5}{4}) = 100 \text{ m}$$
$$320x = 400 \qquad 100(\tfrac{5}{4}) = 125 \text{ m}$$
$$x = \tfrac{400}{320} \qquad 140(\tfrac{5}{4}) = 175 \text{ m}$$
$$x = \tfrac{5}{4}$$

29
$$\frac{QR}{QP} = \frac{RT}{PT} \qquad \frac{QR}{RP} = \frac{RS}{RT} \qquad \frac{QR}{RP} = \frac{QS}{PT}$$
$$\frac{6}{QP} = \frac{21}{28} \qquad \frac{6}{14} = \frac{RS}{21} \qquad \frac{6}{14} = \frac{QS}{28}$$
$$QP = 8 \qquad RS = 9 \qquad QS = 12$$

30 $\triangle ABC \sim \triangle ADE$ by AA~.



So $\frac{5}{15} = \frac{4}{EC+4}$
$$5EC + 20 = 60$$
$$EC = 8$$
If EC = 9, then
$$\frac{5}{15} = \frac{AE}{AE+9} \qquad 4.5 - 4 = .5$$
$$5AE + 45 = 15AE$$
$$AE = 4.5$$
Llong's shadow is $\frac{1}{2}$ ft longer.

31 Let a, b, c, d = 1st, 2nd, 3rd, 4th numbers.
$\frac{a}{b} = \frac{2}{3}, \frac{b}{c} = \frac{5}{4}, \frac{c}{d} = \frac{5}{6}$ and

$a + b + c + d = 771$

Find each number in terms of one letter (use b)

$a = \frac{2}{3}b$, $c = \frac{4}{5}b$, $d = \frac{6}{5}c$ or $d = \frac{6}{5}(\frac{4}{5}b)$

$\frac{2}{3}b + b + \frac{4}{5}b + \frac{24}{25}b = 771$
$$50b + 75b + 60b + 72b = 57{,}825$$
$$257b = 57{,}825$$
$$b = 225$$