` Geo 9 Ch 7

7-1 Ratio and Proportion

POWERPOINTS\Ratio and Proportion.ppt

I Ratio is a comparison! The ratio of 10 girls to 8 boys.

Ratios MUST be reduced!!!

II Ratio can be written as 1) **words** ____________

2) **colon form** ____________

3) **fraction form** ____________

III Ratio must be in the **same** unit. (i.e. hours to hours, minutes to minutes etc)

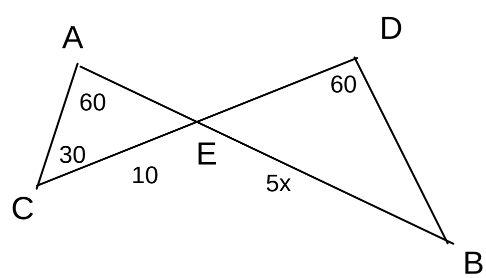
Compare 7 inches to 2 feet

IV **Ratio order** is important.

$$\frac{\text{first mentioned}}{\text{second mentioned}}$$

1) Sure shot Sally has attempted 48 shots and made 36. What is the ratio of shots made to shots attempted?

2.) Given the drawing



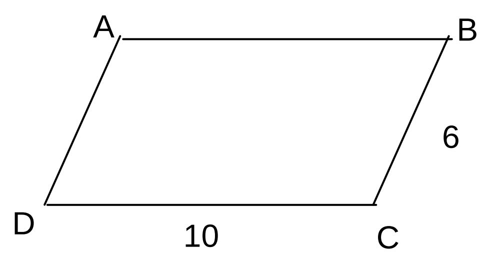
a) find the ratio of CE to BE. __________

b) find the ratio of the largest angle of ΔACE to the smallest angle of ΔDBE __________

3) A telephone pole 7 meters tall snaps into two parts. The ratio of the two parts is 3 to 2. Find the length of each part.

____

ABCD is a parallelogram. Find each ratio.



4) AB: BC __________

5) BC: AD __________

6) m∠A: m∠C __________

7) AB: perimeter of ABCD __________

9. **The measures of the angles of a triangle are in the ratio of 3:4:5. Find the measures of each angle.**

____

7-2 Properties of Proportions

A ***proportion*** is a set of 2 equal ratios, such as $\frac{1}{3}$ and $\frac{12}{36}$ $\qquad \frac{a}{b} = \frac{c}{d}$

The first and last terms of a proportion are called the extremes, and the middle terms are the means. Below, the *means* are in *italics* and **extremes** are **bolded**:

a:*b* = *c*:**d** **6**:*9* = *2*:**3** $\frac{6}{9} = \frac{2}{3}$ Circle the extremes and box the means.
EM=ME

The Means Extremes Property:
The product of the _________ is equal to the product of the _________.

Let's look at different ways to get the same cross product.

If ad = bc

Does $\frac{a}{c} = \frac{b}{d}$, $\frac{b}{a} = \frac{d}{c}$ find some more equal ratios.

If $\frac{2}{3} = \frac{6}{9}$ does $\frac{5}{3} = \frac{15}{9}$, another way to write this is _____ = _____

Properties of Proportions:

1. $\frac{a}{b} = \frac{c}{d}$ is equivalent to:

a) ____________ b) ____________ c ____________ d) ____________

2. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \ldots$ then $\frac{a + c + e + \ldots}{b + d + f + \ldots} = \frac{a}{b} = \ldots\ldots$

1. Using the proportion $\frac{15}{x} = \frac{5}{7}$, complete each statement.

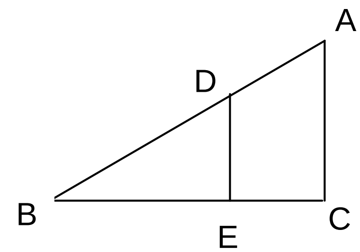
a) 5x = ________

b) $\frac{15}{5}$ = ________

c) $\frac{7(15)}{5}$ = ________

2. If 2x = 3y then $\frac{x}{y}$ = _________ This is how you go from a cross product to a ratio.

3. If $\frac{x}{7} = \frac{3}{2}$ then $\frac{x + 7}{7}$ = _________



In the figure, $\frac{AD}{DB} = \frac{CE}{EB}$

4. $\frac{AD + DB}{DB}$ =

5. If CE = 2, AB = 6 and AD = 3 then BE = _________

6. If AB = 10, DB = 8, and CB = 7.5 then EB = _________.

7-3 Similar Polygons http://www.keymath.com/x3343.xml

Two figures that have 1) ____________, but **NOT NECESSARILY**
2) ____________ are called **similar**.

Two polygons are similar if their vertices can be paired so that

1) Corresponding angles are ___________.
2) Corresponding sides are in ______________
 that is, their lengths have the same ______________.

Corresponding vertices must be listed in order:

Given polygon ABCDE ~ polygon VWXYZ

Draw a picture!!

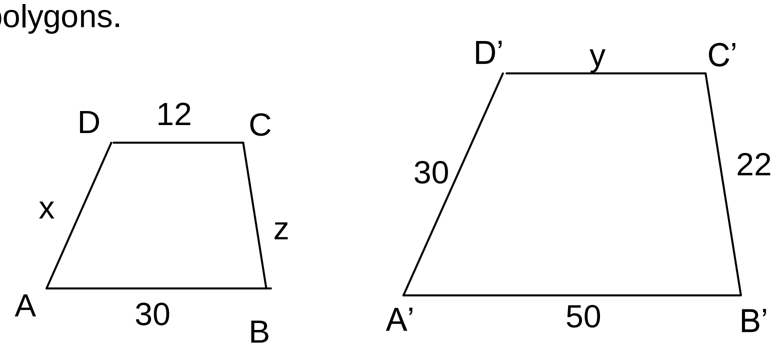
1. List congruent angles. ____

2. List proportions of sides. ____

If polygons are similar then the ratio of the lengths of two corresponding sides is called the _________________________ of the polygons.

Let's try some!!

1. Given quad ABCD ~ quad A'B'C'D'



Find

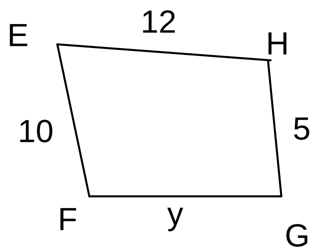
a) their scale factor __________

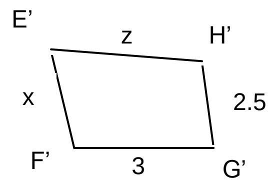
b) the values of x, y and z __________

c) the ratio of the perimeters __________

THE RATIO OF THE PERIMETERS OF SIMILAR FIGURES = ____________________________

2. Quad EFGH ~ Quad E'F'G'H'





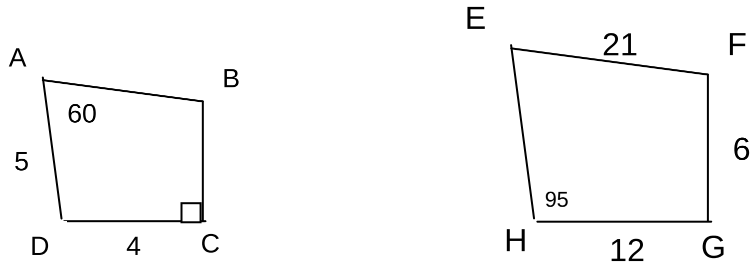
Find:

a) their scale factor ________________

b) the values of x, y and z ________________

c) the ratio of the perimeters ________________

3. Quad ABCD ~ quad EFGH



Complete:

a) m∠E = _________

b) m∠G = _________

c) m∠B = _________

d) if m∠D = 95 then m∠H = _________

e) the scale factor is _________

f) EH = _________

g) BC = _________

h) AB = _________

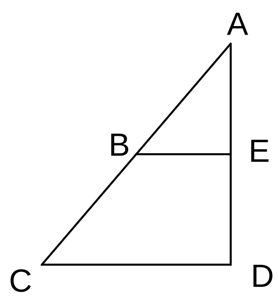
Open your book to p 250 and do CE problem #10 below.

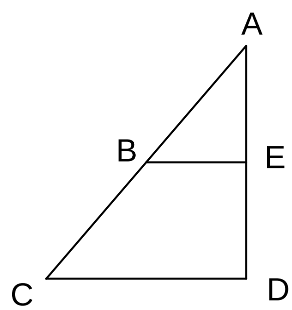
1. The ratio of the measures of the interior angles of a hexagon is 5:6:8:5:4:8. Find the largest angle.

____

2. Fill in the chart: The following holds true: $\frac{AB}{BC} = \frac{AE}{ED}$

	AB	BC	AC	AE	ED	AD
a)	6			4	20	
b)			10		3	12





Solve the following proportions.

3. $\frac{15x}{42} = \frac{12}{7}$

4. $\frac{x+3}{5} = \frac{2x-3}{9}$

x = _______

x = _______

5. $\frac{x+8}{x-2}=\frac{x-1}{x+3}$

x = ______

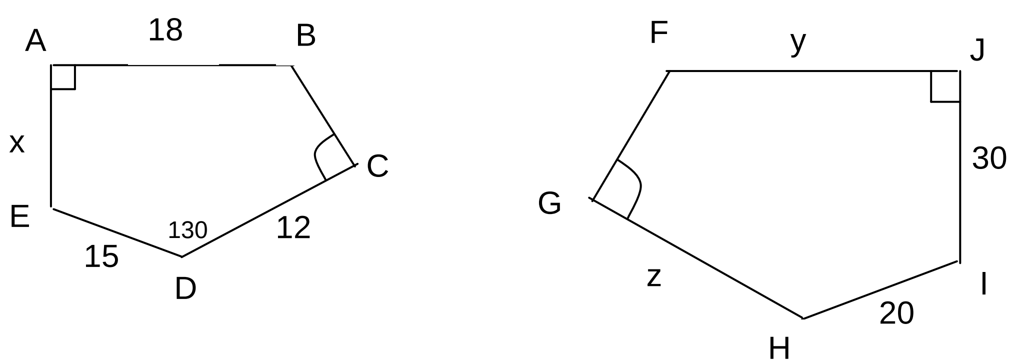
6. If $\frac{x}{5}=\frac{5}{9}$ then $\frac{x+5}{5}=$

______

7. An octagon has sides 3, 4, 6, 7, 10, 11, 11and 12. It is similar to a octagon of perimeter is 24. Find the length of the longest side.

x = __________

8. Given the two similar figures, fill in the blanks.



a. Name the similar figures by filling in the blanks below – ORDER MATTERS!!

Pentagon ___ ___ ___ ___ ___ ~ Pentagon ___ ___ ___ ___ ___

b. Scale factor = _________

c. m $\angle$ H = _________

d. x = _________

e. y = _________

f. z = _________

g. Ratio of perimeters = _________

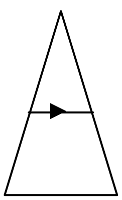
Answers

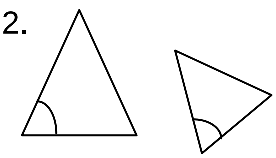
1. 160
2. a) 6 30 36 4 20 24
   b) 7.5 2.5 10 9 3 12
3. x=4 4/5
4. x=42
5. x= -11/7
6. 14/9
7. 4.5
8. a) ABCDE similar to JFGHI
   b) ¾
   c) 130
   d) 22.5
   e)24
   f) 16
   g) ¾

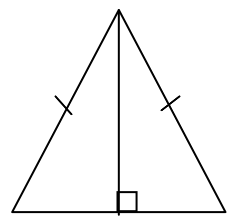
7-4 A postulate for Similar Triangles http://peer.tamu.edu/NSF_Files/Powerpoint.ppt
POWERPOINT/THALES

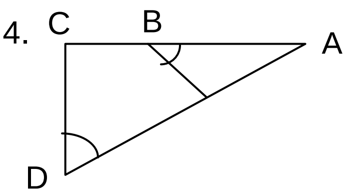
Postulate 15 ___ ____ _____ If two angles of one triangle are congruent to two angles of another triangle, then ______________________________.

Tell whether or not the following triangles are similar.

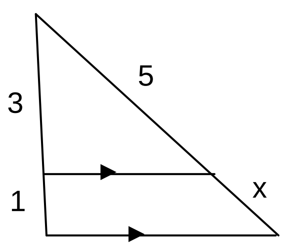
1.


2.


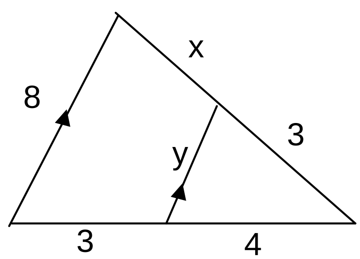
3.


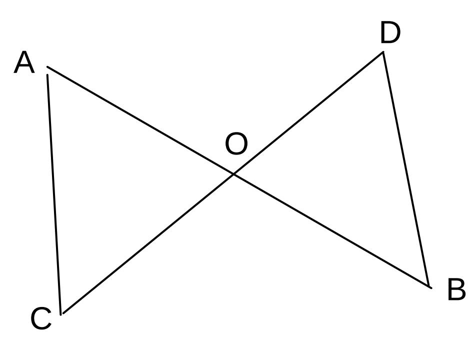
4.


5. Find the value of x



6. Find x and y





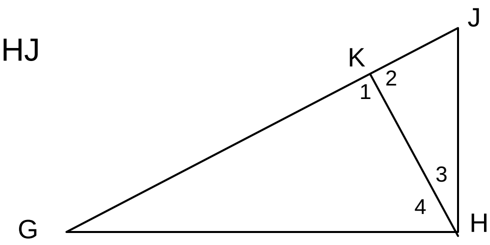
7. Given: $\overline{AC} \parallel \overline{BD}$

Prove: $\frac{CO}{DO} = \frac{OA}{OB}$

8. Given: $\overline{KH}$ is the altitude to hypotenuse $\overline{GJ}$ of $\triangle$GHJ

Prove: $\dfrac{KH}{HG} = \dfrac{HJ}{GJ} = \dfrac{KJ}{HJ}$

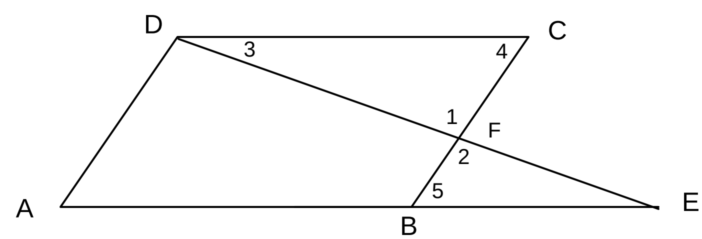
Then: HJ x HJ = GJ x KJ



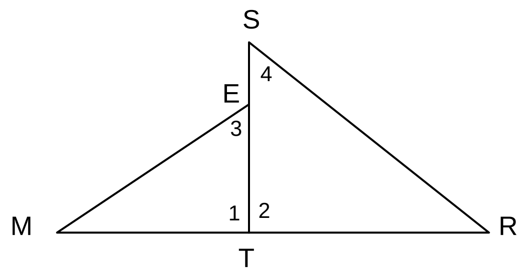
9. Given: ABCD is a parallelogram

Prove: $\dfrac{BF}{CF} = \dfrac{FE}{FD}$

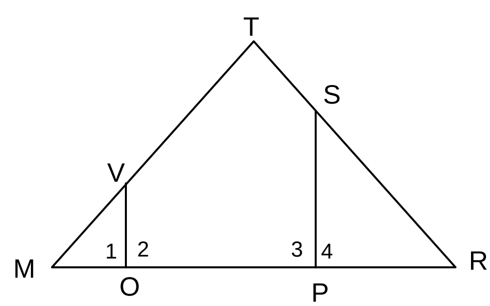
Then: BF • FD = CF • FE



10. Given: <MET $\cong$ <RST
$\overline{ST} \perp \overline{MR}$
Prove: ME • ST = RS • ET



11. Given: $\triangle$MTR is isosceles with legs $\overline{MT}$ *and* $\overline{RT}$
$\overline{VO} \perp \overline{MR}$, $\overline{SP} \perp \overline{MR}$
Prove: MO • RS = RP • MV



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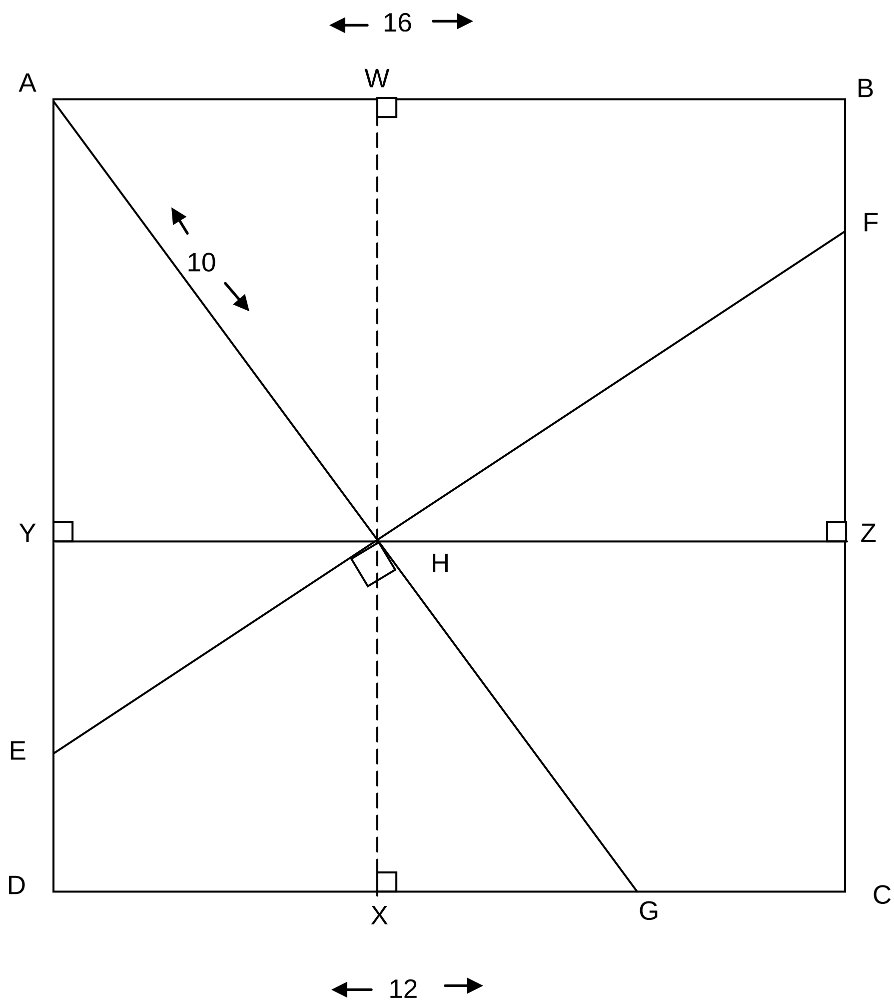


SQUARE ABCD

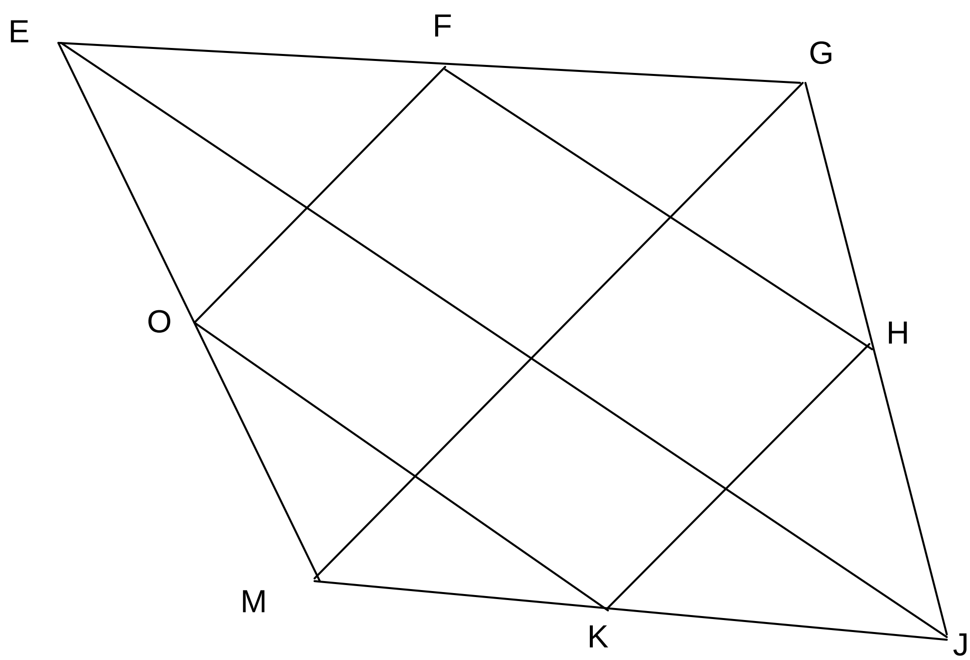
FIND: HX, HY, HW, BF, FC, CG, DE, EA, EH, HF

AB = 16
DG = 12
AH = 10
HG = 10

Additional Homework Problem: do day after completion of homework for Sec. 7.4

O, F, H, K are midpoints . $\frac{OF}{OK} = \frac{3}{4}$ MG + EJ = 42

Find OK



Geo 9
Ch 7
7-5 Theorems for Similar Triangles.

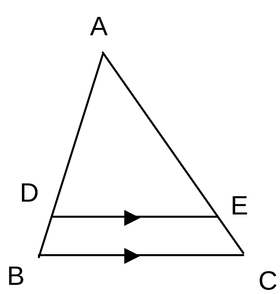
Theorem 7-1 ___ ___ ___ Similarity Theorem: If an angle of one triangle is congruent to an angle of another and the sides ______________________________ Then ______________________________

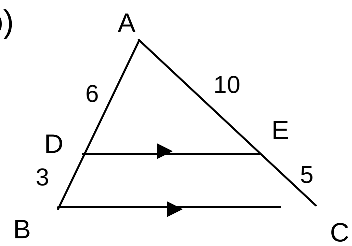
Theorem 7-2 ___ ___ ___ Similarity Theorem: If the sides of two triangles are _____________ _______ then _______________________________.

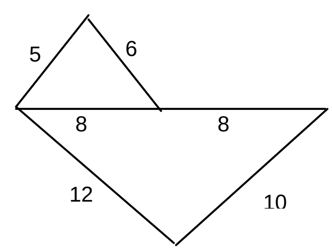
1. The measures of the sides of ΔABC are 4, 5, and 7. The measures of the sides of ΔXYZ are 16, 20 and 28. Are the triangle similar? If so, what is the scale factor?

2. In ΔABC AB=2, BC=5 and AC=6. In ΔXYZ XY=2.5, YZ=2, and XZ=3. Is ΔABC ~ ΔXYZ?

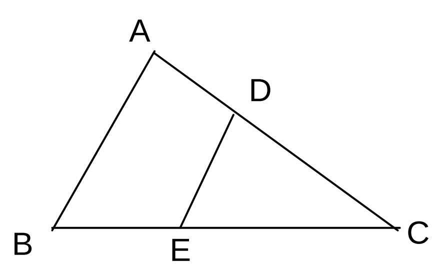
3. Name the similar triangles and give the postulate or theorem that justifies your answer.

a)


b)


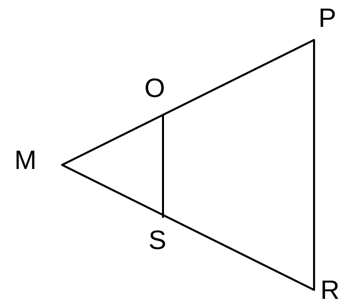
c)


4. Given ∠B ≅ ∠ DEC
Prove: ΔABC ~ ΔDEC



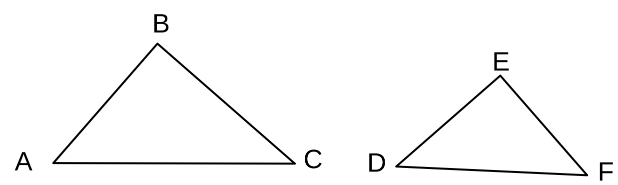
5) PROVE: $\triangle MOS \sim \triangle MPR$

1. $\dfrac{MO}{MP} = \dfrac{MS}{MR}$	1. GIVEN



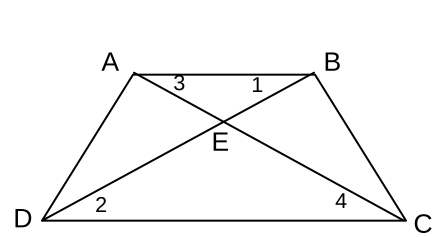
6) PROVE: AB x FD = FE x AC

1. $\triangle ABC \cong \triangle FED$	1. GIVEN

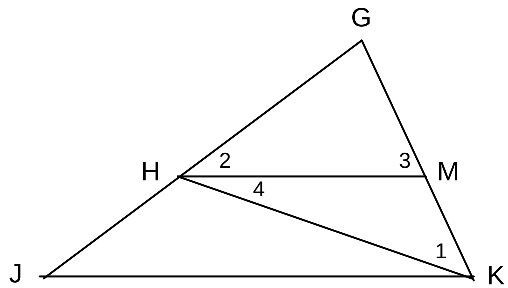


7) PROVE: AB x ED = CD x BE

1. Trapezoid ABCD bases $\overline{AB}$, $\overline{DC}$	1. Given



8)



Prove: $\overline{HM} \parallel \overline{JK}$

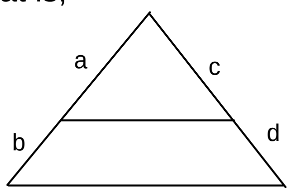
1. $\dfrac{GJ}{HK} = \dfrac{GK}{GM}$ $\quad \sphericalangle 1 \cong \sphericalangle G$	1. Given

7-6 Proportional Lengths

Divided Proportionally means ____
____.

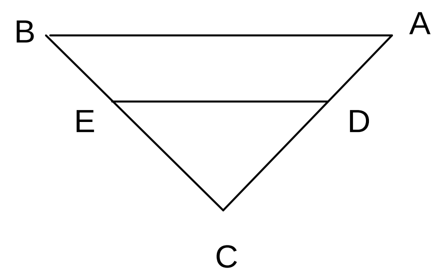
Theorem 7-3 Triangle Proportionality Theorem : If a line _____________ to one side of a triangle intersects _________________ then it divides those sides proportionally.

That is,



Lets do some sample problems

1. Given the picture to the right:



a) $\frac{CD}{DA} =$

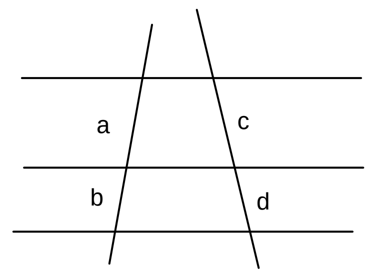
b) If CD = 3, DA = 6 and DE = 3.5, then AB = ______.

c) If CB = 12, EB = 8 and CD = 6 then DA = ______.

d) If CD = $\frac{1}{2}$, DA = $\frac{1}{3}$ and EC = $\frac{3}{4}$ then BC = ________

Corollary: If three____________ lines intersect two transversals, then they _________________
____.

2. Given the drawing,



a) Write an acceptable proportion.

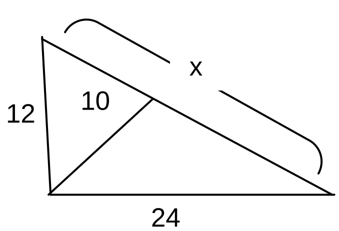
b) If a = 2, b = 3 and c = 5 then d = ______.

c) If a = 4, b = 8 and c = 5 then c + d = ______.

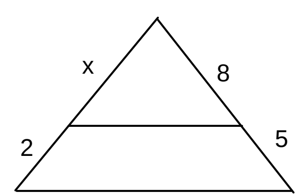
Theorem 7-4 Triangle Angle-Bisector Theorem: If a ray bisects an angle of a triangle, then it _______________ the ___________________________ into _____________________________ to the ______________________________,

Again, lets draw a picture to show what this means:→

3. Find the value of x:

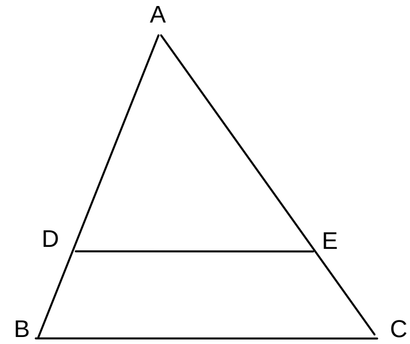


4. Find the value of x:



Review Sheet Ch 7 Similarity

1. Refer to the figure, given DE || BC



a) AD = 7, BD = 3, DE = 6 Find BC __________

b) AD = 3, BD = 5, AE = 4, Find CE __________

c) AD = 4, AB = 10, BC = 25 Find DE __________

d) AD = CE, BD = 4, AE = 9 Find AB __________

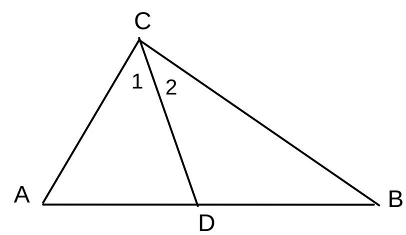
e) AD = x-1, BD = 5, AE = 1, CE = x+3, DE = 2x+1

Find BC __________

f) AD = 2x, BD = x+3, AE = 4x-1, CE = 5x, BC = 6x+2

Find DE ________

2. Refer to the figure, given $\angle 1 \cong \angle 2$

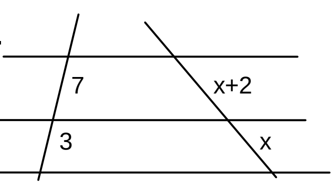


a) AC = 6, BC = 8, BD = 5 Find AD ___________

b) AB = 10, AC = 4, BC = 8 Find AD ___________

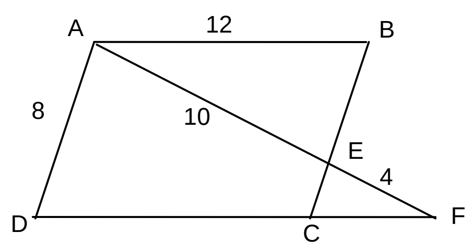
c) AC = 3, AD = x-4, BC = x, BD = 4 Find BC _________

3.



x = __________

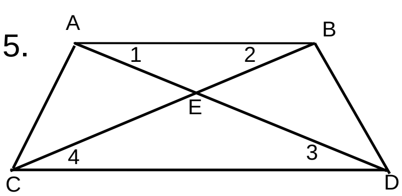
4.



ABCD is a parallelogram, sides as marked

BE ________ CE _________ CF __________

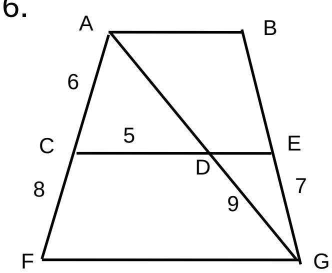
5.



Given: AB || CD

Prove: AE • CE = DE • EB

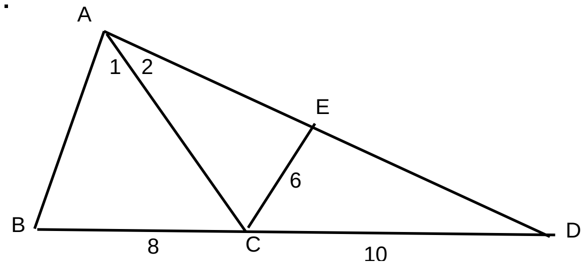
6.



Given AB || CE || FG

Find AD ______ BE ______ FG ______

7.

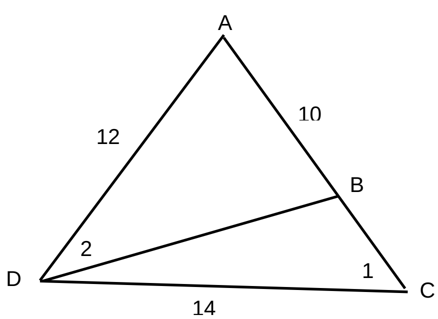


Given AB || CE, ∠1≅∠2

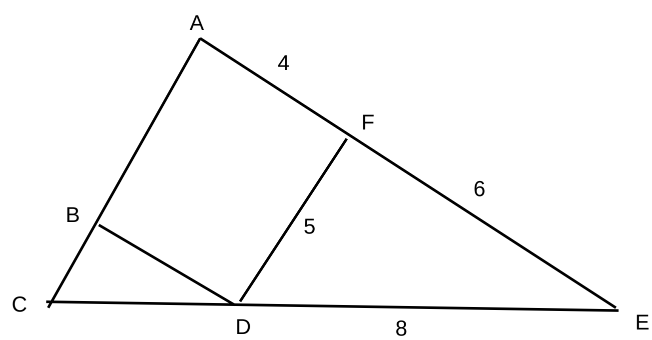
Find AB ______ AD _______ AE _______

DE ______

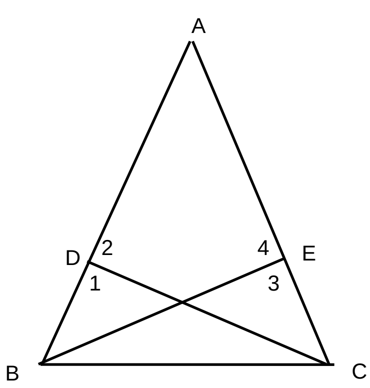
8. Given: ∠1≅∠2, sides as marked
Find: AC _______ BD _______



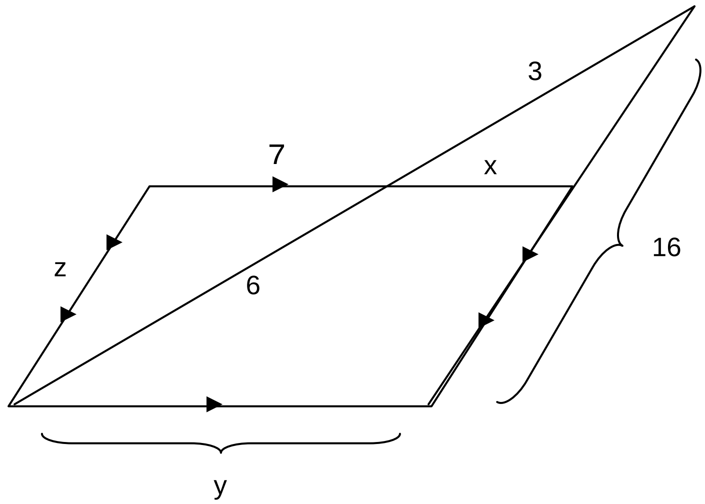
9. Given BD || AE, DF || AC, sides as marked
Find: AC ______ BD _______ CD ________



10. Given BE and CD are altitudes
Prove: AE ● AC = AD ● AB



11)

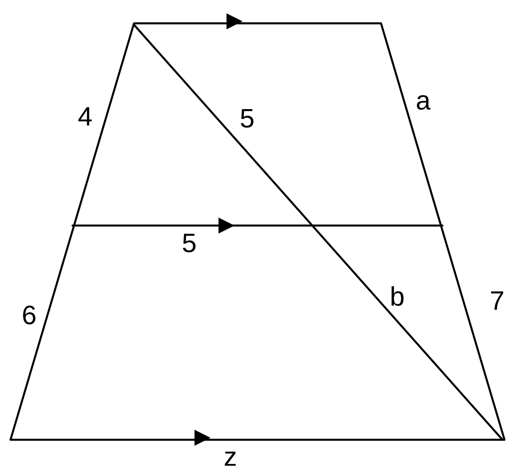


x = ______________

y = ______________

z = ______________

12)

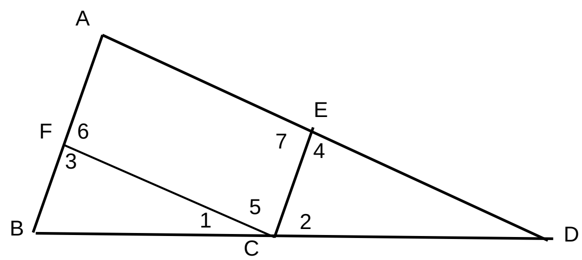


a = ______________

b = ______________

z = ______________

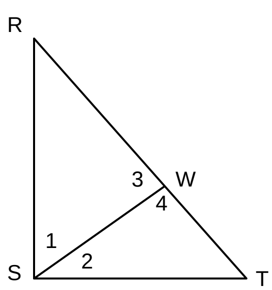
13)



Prove: BF x ED = CE x AE

1. $\overline{FC} \parallel \overline{AD}, \quad \overline{CE} \parallel \overline{AB}$	1. Given

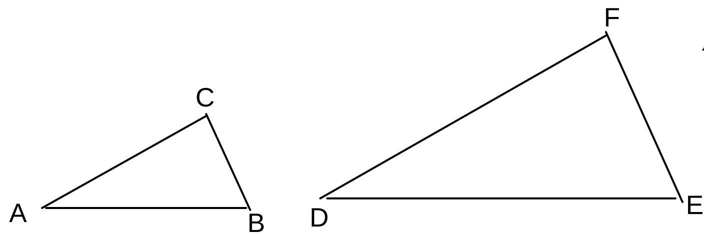
14)



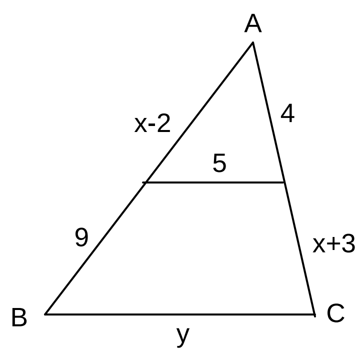
Prove: $ST^2 = TW \ x \ RT$

1. $\overline{RS} \perp \overline{ST}, \quad \overline{SW} \perp \overline{RT}$	1. Given

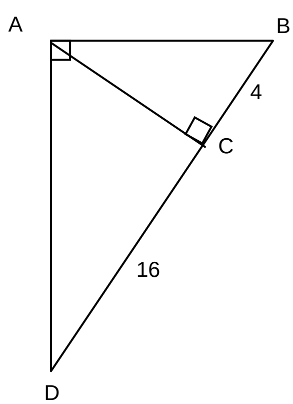
15) Find the ratio of x to y $\frac{8}{2x-3y}=\frac{7}{6x-4y}$

16) 

$\triangle ABC \sim \triangle DEF$ <A = 50
<D = 2x+5y
<E = 5x + y
<B = 94 - x
Find <F = ___________

17) 

Find the perimeter of $\triangle ABC$ ___________

18) 

Find AD, AB, AC