Name:_____ Period _____ GP

UNIT 12: SIMILARITY

I can define, identify and illustrate the following terms:

Similarity	Image	Ratio	Similarity ratio
Dilation	Similarity Statement	Proportion	AA
Scale Factor	Scale Drawing	Cross products	SAS
Pre Image	Geometric Mean	Indirect measurement	

Dates, assignments, and quizzes subject to change without advance notice.

Monday	Tuesday	Block Day	Friday
26 7-1 Ratios and Proportions	27 7-2 Similar Polygons	28/29 **QUIZ 1** 7-3 Triangle Similarity	30 Proofs Practice
3 7-4 Applications	4 7-5 Proportional Relationships	5/6 8-1 Geometric Mean	7 **QUIZ 2**
10 7-6 Dilations & Similarity in the Coordinate Plane	11 **Review**	12/13 **TEST 12**	14 Semester Review

Monday, 11/26

7-1: Ratio and Proportion

- ☐ I can write a ratio.
- ☐ I can solve a linear proportion.
- ☐ I can solve a quadratic proportion.

PRACTICE: Pg 458 #8-15, 24-26, 31-34, 41, 43

Tuesday, 11/27

7-2: Similar Polygons

- ☐ I can use the definition of similar polygons to determine if two polygons are similar.
- ☐ I can determine the similarity ratio between two polygons.

PRACTICE: Pg 465 #7-17, 19-20, 23, 25, 28, 29

Wednesday, 11/28 or Thursday, 11/29

7-3: Triangle Similarity ➔ **QUIZ 1: 7-1 & 7-2**

- ☐ I can use the triangle similarity theorems to determine if two triangles are similar.
- ☐ I can use proportions in similar triangles to solve for missing sides.
- ☐ I can set up and solve problems using properties of similar triangles.
- ☐ I can prove triangles are congruent in a two-column proof.

PRACTICE: Pg 474 #1-4, 11-14, 16, 20-24

Proofs: p 474 #7, 8, 17, 18

Friday, 11/30

Proofs Practice

- ☐ I can prove triangles are congruent in a two-column proof.

PRACTICE: Similarity Proofs Worksheet

Monday, 12/3

7-4: Applications and Problem Solving

- ☐ I can use the triangle proportionality theorem and its converse.
- ☐ I can use the Triangle Angle Bisector Theorem.

PRACTICE: Pg 485 #8-20, 25, 28, 34

Tuesday, 12/4

7-5: Using Proportional Relationships

- ☐ I can use proportions to determine if a figure has been dilated.
- ☐ I can use ratios to make indirect measurements.

PRACTICE: Pg 491 #2, 10-12,18-19, 24-26, 28, 34

Wednesday, 12/5 or Thursday, 12/6

Geometric Mean

- ☐ I can use geometric mean.

PRACTICE: Geometric Mean Worksheet

Friday, 12/7

➔ QUIZ 2: Similar Triangles (7-3 through 7-5 and Geometric Mean)

- ☐ I can demonstrate my ability on all previously learned material.

Monday, 12/10

7-6: Dilations & Similarity in the Coordinate Plane

- ☐ I can use coordinate proof to prove figures similar.
- ☐ I can apply similarity in the coordinate plan.

PRACTICE: Pg 498 #4-7, 11-14, 21-24

Tuesday, 12/11

Review

PRACTICE: Review Worksheet; Pg 504 – 507 has even MORE practice if you need it.

Wednesday, 12/12 or Thursday, 12/13

➔ Test 12: Similarity

Notes: Similar Figures

What does it mean to be similar?

What do similar figures and congruent figures have in common?

What is different about similar figures and congruent figures?

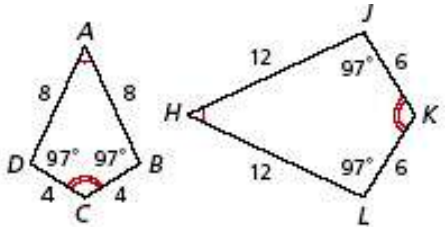
Example: Identify the pairs of congruent angles and proportional sides in the following figure.

$\measuredangle A \cong$ _____ $\quad \overline{AB} \sim$ _____

$\measuredangle B \cong$ _____ $\quad \overline{AD} \sim$ _____

$\measuredangle K \cong$ _____ $\quad \overline{JK} \sim$ _____

$\measuredangle L \cong$ _____ $\quad \overline{KL} \sim$ _____



A similarity statement can be written to show that polygons are similar. Ex: $\Delta ABC \sim \Delta DEF$

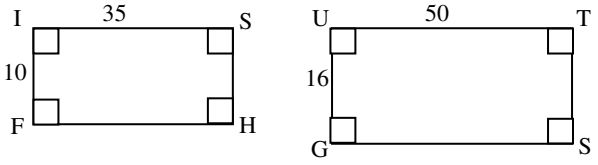
Example: Write a similarity statement for the figures above.

A similarity ratio is a ratio that compares the _____ of the corresponding sides of two similar polygons. The ratio is written in the same order as the _____ _____.

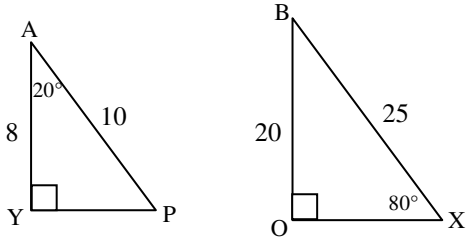
Example: Write a similarity ratio for the figures above.

Example) Determine if each pair of polygons are similar. If so, write the similarity statement and the similarity ratio.

a)



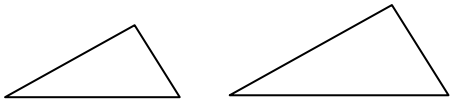
b)



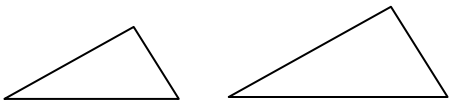
Notes: Similar Triangles

There are 3 ways you can prove triangles similar WITHOUT having to use all sides and angles.

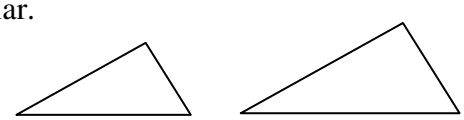
Angle- Angle Similarity (AA~) – If two angle of one triangle are _____ to two corresponding angles of another triangle, then the triangles are similar



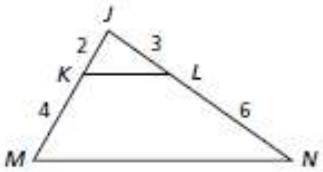
Side- Side- Side Similarity (SSS~) – If the three sides of one triangle are _____ to the three corresponding sides of another triangle, then the triangles are similar.



Side-Angle- Side Similarity (SAS~) – If two sides of one triangle are _____ to two corresponding sides of another triangle and their included angles are _____, then the triangles are similar.



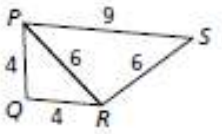
Examples: Determine if the triangles are similar. If so, tell why and write the similarity statement and similarity ratio.



Similar : Y or N Why:_____

Similarity Statement :_____~_____

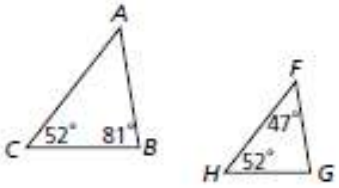
Similarity Ratio :_____



Similar : Y or N Why:_____

Similarity Statement :_____~_____

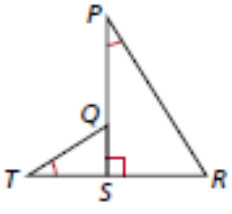
Similarity Ratio :_____



Similar : Y or N Why:_____

Similarity Statement :_____~_____

Similarity Ratio :_____



Similar : Y or N Why:_____

Similarity Statement :_____~_____

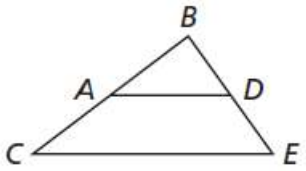
Similarity Ratio :_____

Notes: Proving Triangles are Similar

Given: BC = 2(BA)
BE = 2(BD)

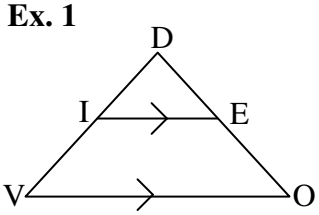
Prove: $\triangle BDA \sim \triangle BEC$

Proof:



Notes: Properties of Similar Triangles

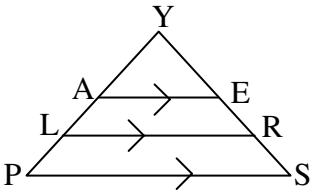
Ex. 1



$\frac{ID}{IV} = \frac{ED}{}$

$\frac{ID}{DV} = \frac{ED}{}$

Ex. 2

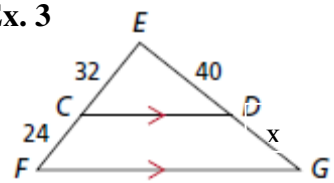


$\frac{AY}{LA} = \frac{YE}{}$ $\quad \frac{AY}{YR} = \frac{AE}{}$

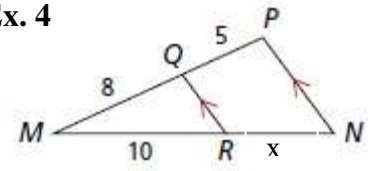
$\frac{LY}{PL} = \frac{}{SR}$ $\quad \frac{PA}{ES} = \frac{AY}{}$

Now that you can write the proportions, you can solve problems.

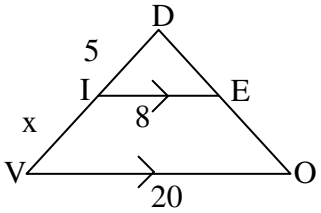
Ex. 3



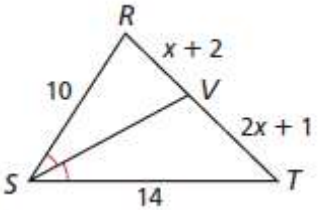
Ex. 4



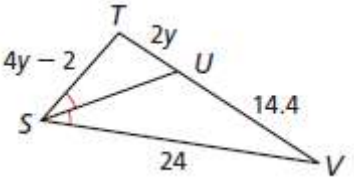
Ex. 5



Ex. 6 Find RV

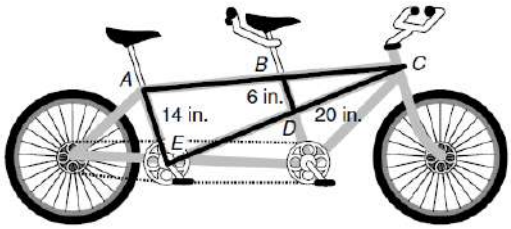


Ex. 7 Find y



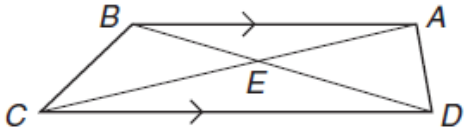
Worksheet: Proving Triangles are Similar (use a separate sheet of paper)

Given: AE is parallel to BD
Prove: $\triangle CBD \sim \triangle CAE$

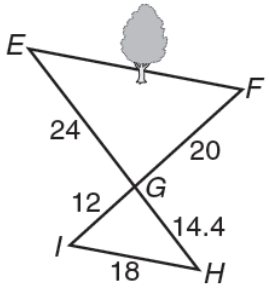


Given: $\overline{AB} \parallel \overline{DC}$

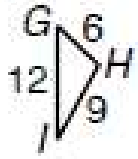
Prove: $\triangle AEB \sim \triangle CED$

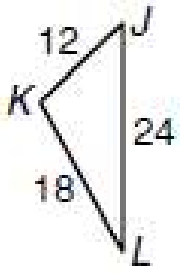


Given: 10(GH) = 6(EG)
10(IG) = 6(EG)
Prove: $\angle E \cong \angle H$



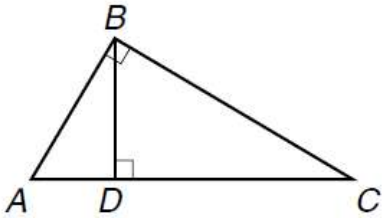
Given: $\triangle$GHI and $\triangle$JKL
Verify: $\triangle$ GHI $\sim$ $\triangle$ JKL in a paragraph proof





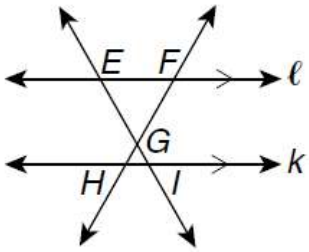
Given: right $\triangle ABC$; $\overline{BD} \perp \overline{AC}$

Prove: $\triangle ABC \sim \triangle ADB$

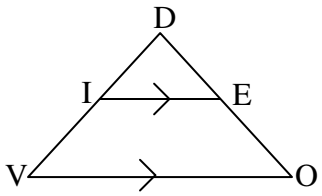


Given: $\ell \parallel k$

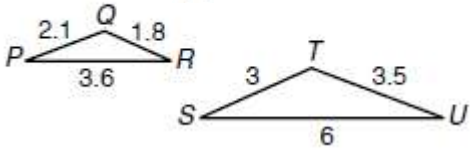
Prove: $\triangle EFG \sim \triangle IHG$



Given: IE is parallel to VO
Prove: $\frac{ID}{IV} = \frac{ED}{EO}$



Given: $\triangle PQR$ and $\triangle UTS$
Verify: $\triangle$ PQR $\sim$ $\triangle$UTS in a paragraph proof

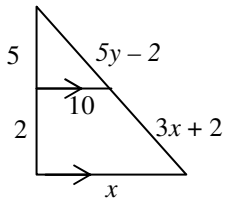


Proportional Relationships – Extra Practice

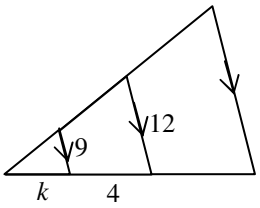
Solve for the variable in each figure.

1. y =_____

   x = _____

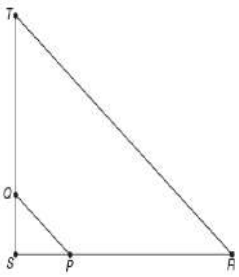


2. k =_____



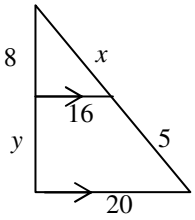
3. SQ = x ; ST = 22 ;
   SP = 12 ; PR = 4x+8

   x = _____

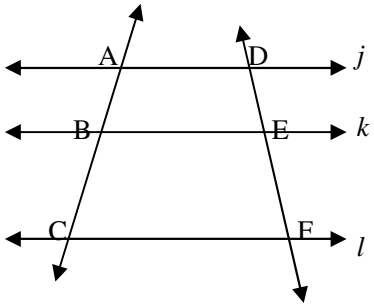


4. y =_____

   x = _____



Given: $j \parallel k \parallel l$



5. AC = 9; BC = 6; DF = 15

   EF = _____

7. BC = x + 2; BA = 9; EF = x + 3; ED = 12

   x = _____; BC = _____; EF = _____

6. AB = 5y; DE = 2y; EF = 12

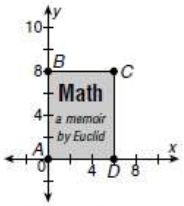
   BC = _____

8. AC = 3x; BC = 16; EF = 20; FD = 4x -2

   x = _____; AC = _____; FD = _____

Dilations & Similarity in the Coordinate Plane Notes

A publisher is preparing the marketing plan for a new book. The actual cover of the book measures 6 inches by 8 inches, as shown in the figure. The publisher needs to make a reduced image of the book cover for advertisements. Complete Exercises 1–4 to draw the outline of the reduced cover.



1. Use the figure to find the coordinates of each vertex.

   A(_____, _____) B(_____, _____)

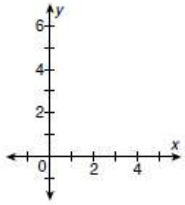
   C(_____, _____) D(_____, _____)

2. The publisher wants to make a reduction using a dilation with a scale factor of $\frac{1}{2}$. Multiply the coordinates by the scale factor to find the coordinates of the reduction.

   A'(_____, _____) B'(_____, _____)

   C'(_____, _____) D'(_____, _____)

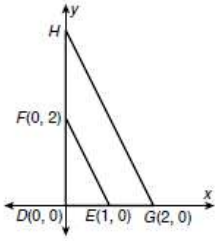
3. Plot the coordinates of the reduction and draw the new outline of the book cover.

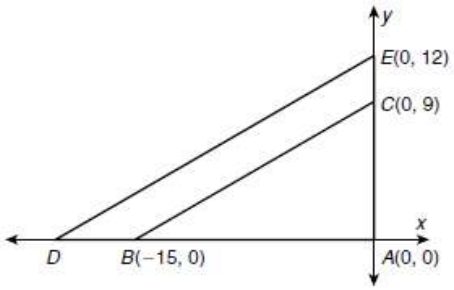


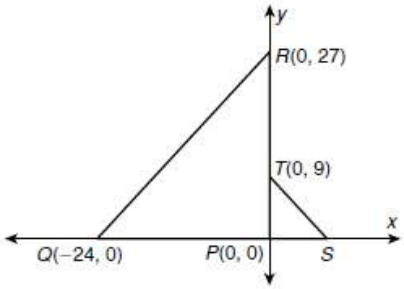
In the figure, $\triangle DGH$ is a dilation image of $\triangle DEF$.

4. Find the scale factor and the coordinates of H.

_____







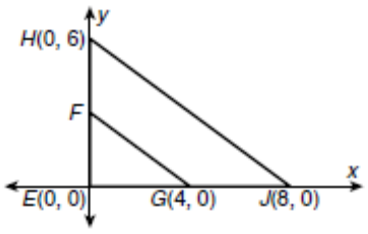
5. Given that $\triangle ABC \sim \triangle ADE$, find the scale factor and the coordinates of D.

_____

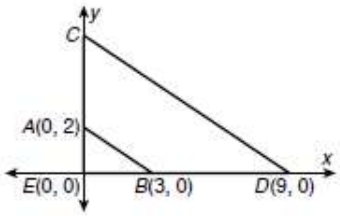
6. Given that $\triangle PQR \sim \triangle PST$, find the scale factor and the coordinates of S.

_____

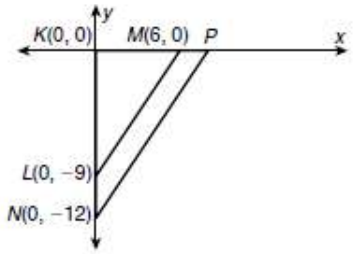
7. **$\triangle FEG \sim \triangle HEJ$. Find the coordinates of F and the scale factor.**



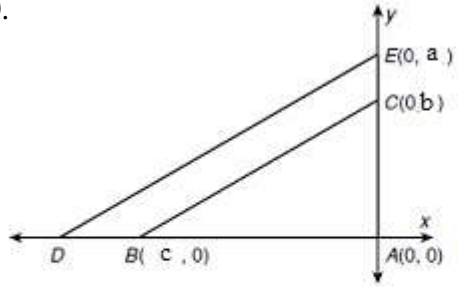
8. Given that $\triangle AEB \sim \triangle CED$, find the coordinates of C and the scale factor.



9. Given that $\triangle LKM \sim \triangle NKP$, find the coordinates of P and the scale factor.

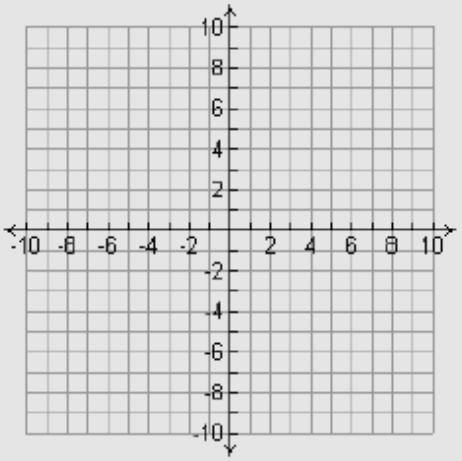


10.

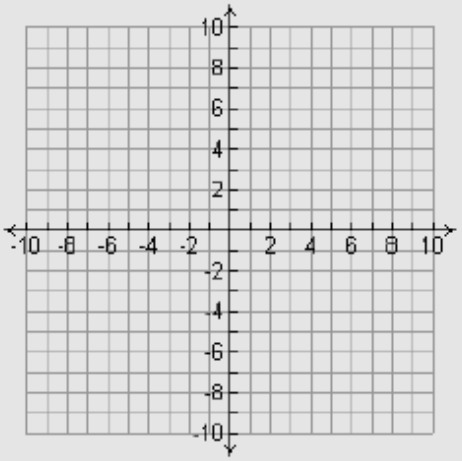


Given that $\triangle ABC \sim \triangle ADE$, find coordinates of D.

11. **Given:** $E(-2, -6)$, $F(-3, -2)$, $G(2, -2)$, $H(-4, 2)$, and $J(6, 2)$.
Prove: $\Delta EHJ \sim \Delta EFG$.



12. **Given:** $R(-2, 0)$, $S(-3, 1)$, $T(0, 1)$, $U(-5, 3)$, and $V(4, 3)$.
Prove: $\Delta RST \sim \Delta RUV$



Notes: Geometric Mean

Sequences:

Arithmetic: 2, 5, 8, 11, 14, ____, ____, ____ What is the common difference?

Geometric: 2, 6, 18, 54, 162, _____, _____, ____ What is the common factor?

1. Starting with the number 1 and using a factor of 4, create 5 terms of a geometric sequence.
2. Starting with the number 5 and using a factor of 3, create 5 terms of a geometric sequence.
3. In the geometric sequence 2, ____, 72, 432, .Find the missing term.
4. In the geometric sequence 6, ____, 24,... Find the missing term.

A term between two terms of a geometric sequence is the _____ _____ of the two terms.

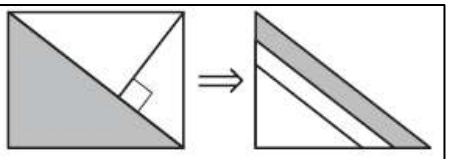
The geometric mean of two positive numbers is the positive square root of their products. For $\frac{a}{x}=\frac{x}{b}$, the x is the geometric mean.

Examples: Find the geometric mean of the given numbers.

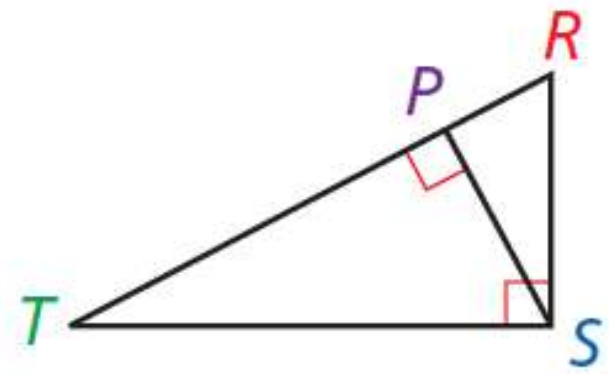
a. 4 and 9 b. 6 and 15 c. 2 and 8

The altitude to the hypotenuse of a right triangle forms two triangles that are _____ to each other and to the original triangle. In other words, there are _____ similar triangles: a small one, a medium one, and a large one.

Take a rectangular sheet of paper and draw the segments shown at right. Cut out the three triangles and align them as shown. If your work is accurate, the triangles should appear similar. In fact, you have demonstrated the following important theorem about right triangles.

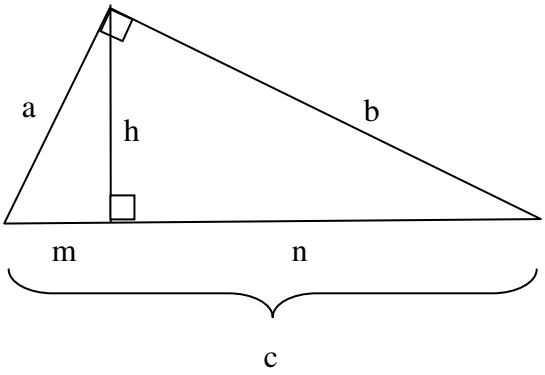


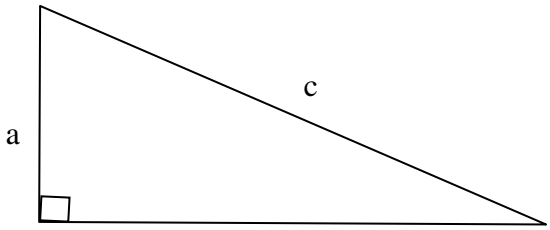
1. Draw the three proportional triangles from this sketch:

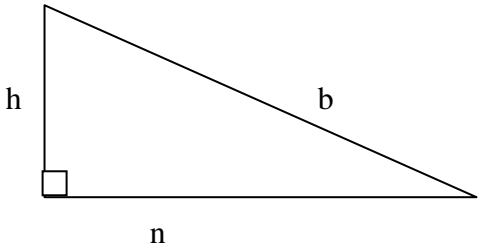


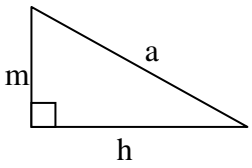
Examples:

Ex 1: m = 2, n = 10, h = _____

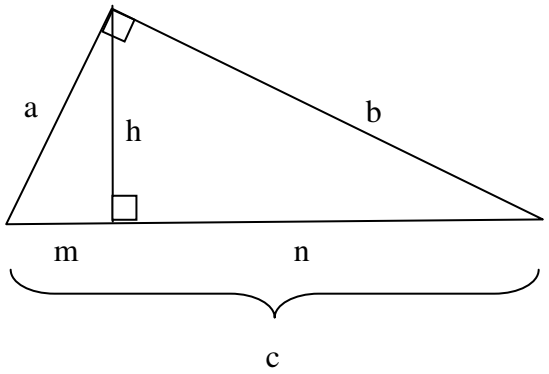








Ex 2: m = 2, n = 10, b = _____



You draw the similar triangles:

1. c = 12; m = 6; a = ?

2. m = 4; h = 25; n = ?

3. c = 12; m = 4; h = ?

Worksheet: Geometric Mean

What's the next number in the sequence? 1.1, 2.2, 4.4, 8.8, _____

What's the common ratio of the sequence(s) below?

2, 10, 50, 250, 1250, ... _____
1, -3, 9, -27, 81, -243, ... _____
1, 4, 7, 10, 13, 16, ... _____

3 Write two possible answers for the geometric mean of -32 and -2?

For questions 1-5, find the Geometric Mean of the following:

1. 2 and 50

equation

x = _____

2. 50 and 1250

equation

x = _____

3. 5 and 45

equation

x = _____

4. 45 and 405

equation

x = _____

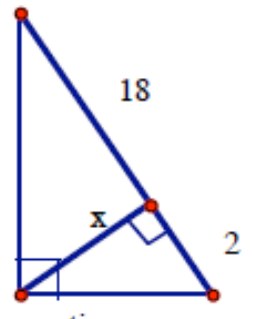
5. 6.4 and 8.8

equation

x = _____

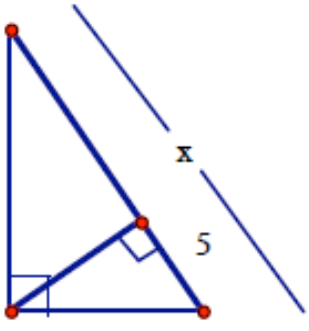
For questions 6- 15, solve for the missing value(s).

6.



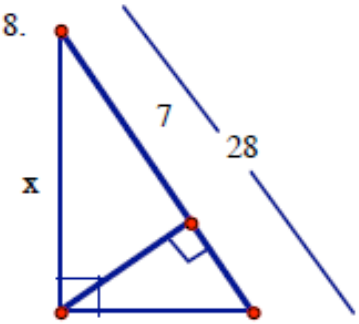
equation

7.



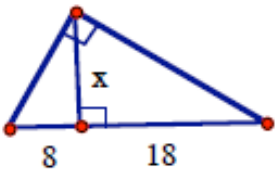
equation

8.



equation

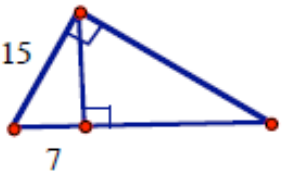
9.



equation

x = _____

10.

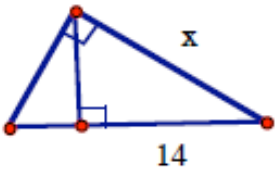


x

equation

x = _____

11.

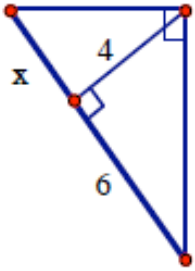


30

equation

x = _____

12.

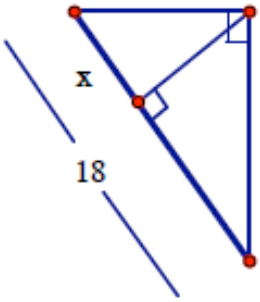


equation

x = _____

13.

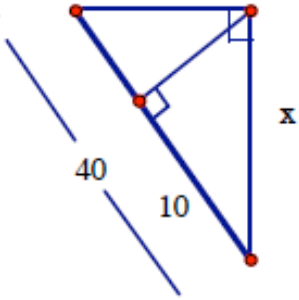
12



equation

x = _____

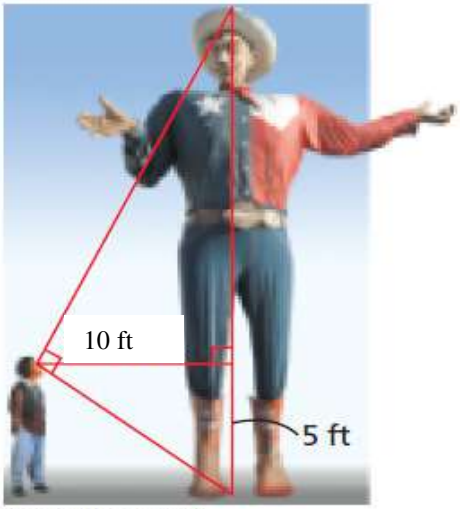
14.



equation

x = _____

The statue is how tall?



Not drawn to scale

Find the length of *AD*.