Geometry 1-2 Volume	**UNIT 11**	Name:________________________ Teacher: _____________ Per:___

My academic goal for this unit is...	Check for Understanding Key: ● Understanding at start of the unit ❙ Understanding after practice ▲ Understanding before unit test

LEARNING TARGETS		How is my understanding?	Test Score	Retake?
11a	I can identify and name similar polygons.	1 2 3 4		
11b	I can determine if triangles are similar using the triangle similarity shortcuts (AA, SSS and SAS).	1 2 3 4		
11c	I can apply the properties of similar triangles and indirect measurement to calculate unmeasurable lengths.	1 2 3 4		
11d	I can identify the corresponding parts of similar triangles.	1 2 3 4		
11e	I can use proportions to calculate the volume and areas of similar solids.	1 2 3 4		
11f	I can apply the parallel/proportionality conjecture to determine unknown segment lengths.	1 2 3 4		

Is there similarity in nature?

How does similarity help us measure immeasurables?

DP/1 **Developing Proficiency** Not yet, Insufficient	CP/2 **Close to Proficient** Yes, but..., Minimal	PR/3 **Proficient** Yes, Satisfactory	HP/4 **Highly Proficient** WOW, Excellent
I can't do it and am not able to explain process or key points	I can sort of do it and am able to show process, but not able to identify/explain key math points	I can do it and able to both explain process and identify/explain math points	I'm great at doing it and am able to explain key math points accurately in a variety of problems

Unit 11 Conjectures

Title	***Conjecture***	***Diagram***
Dilation Similarity Conjecture	If one polygon is the image of another polygon under a dilation, then ______________________ ____.	
AA Similarity Conjecture	If _______ angles of one triangle are congruent to _______ angles of another triangle, then ____ ____.	
SSS Similarity Conjecture	If the three sides of one triangle are proportional to the three sides of another triangle, then the two triangles are _____________________.	
SAS Similarity Conjecture	If two sides of one triangle are proportional to two sides of another triangle and ____________ ______________________________, then the ____.	
Proportional Parts Conjecture	If two triangles are similar, then the corresponding _____________, _____________, and ______________ are ________________ to the corresponding sides.	
Angle Bisector/Opposite Side Conjecture	A bisector of an angle in a triangle divides the opposite side into segments who lengths are in the same ratio as __________________________ ____.	
Proportional Areas Conjecture	If corresponding sides of two similar polygons or the radii of two circles compare in the ratio $\frac{m}{n}$, then their areas compare in the ratio _____.	

Unit 11 Conjectures

Proportional Volumes Conjecture	If corresponding edges (or radii, or heights) of two similar solids compare in the ratio $\frac{m}{n}$, then their volumess compare in the ratio ______.	
Parallel/ Proportionality Conjecture	If a line parallel to one side of a triangle passes through the other two sides, then it divides the other two sides ______________________________. Conversely, if a line cuts two sides of a triangle proportionally, the it is ___________________ to the third side.	
Extended Parallel/ Proportionality Conjecture	If two or more lines pass through two sides of a triangle parallel to the third side, then they divide the two sides __________________________.	

Additional Notes:

Notes

Notes

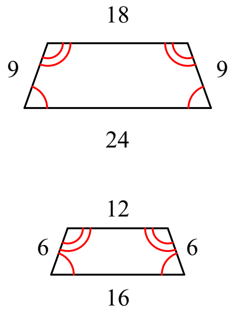
Geometry 1-2 Name: ____________________

Practice: Similar Polygons

Date: ________________ Period: ____

State if the polygons are similar.

1)



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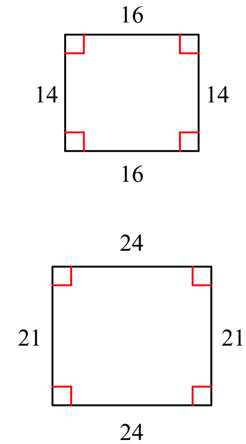

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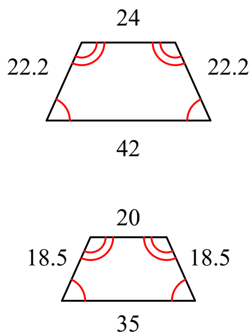

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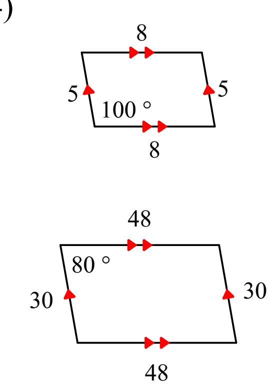


Solve each proportion.

5) $\frac{5}{9} = \frac{3}{x}$

6) $\frac{n}{5} = \frac{4}{10}$

7) $\frac{x}{4} = \frac{7}{10}$

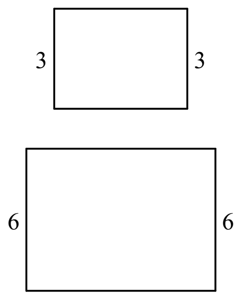
8) $\frac{10}{x} = \frac{2}{10}$

9) $\frac{4}{x-5} = \frac{10}{7}$

10) $\frac{2}{m+5} = \frac{5}{8}$

The polygons in each pair are similar. Find the scale factor of the smaller figure to the larger figure.

11)



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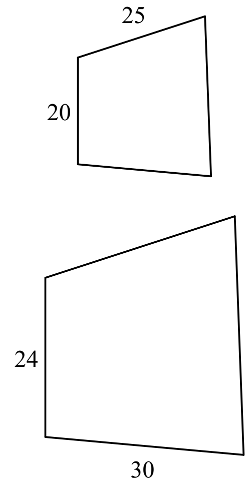

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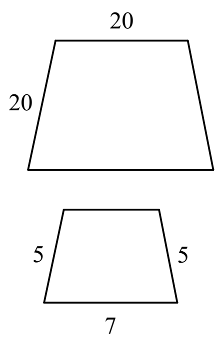

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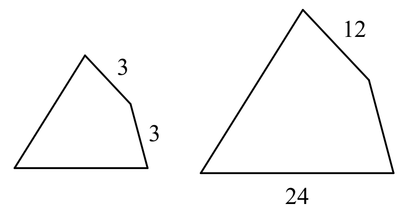
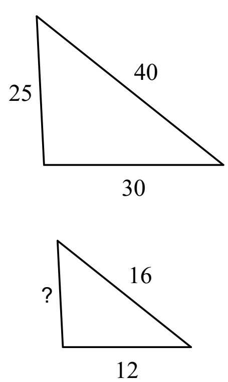


The polygons in each pair are similar. Find the missing side length.

15)



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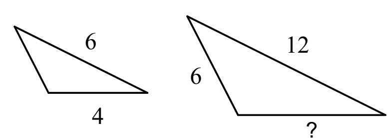

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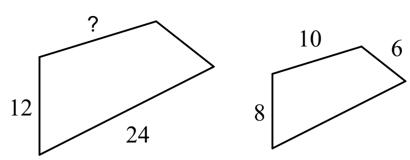

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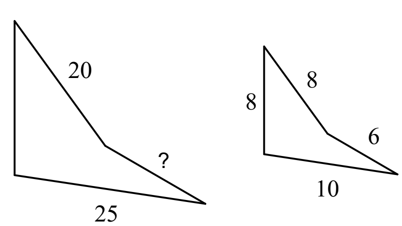


Lesson 11.1 • Similar Polygons

Name ______________________________ **Period** __________ **Date** ____________

All measurements are in centimeters.

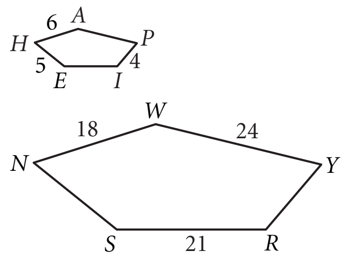
1. *HAPIE* ~ *NWYRS*

$AP =$ _____

$EI =$ _____

$SN =$ _____

$YR =$ _____



2. *QUAD* ~ *SIML*

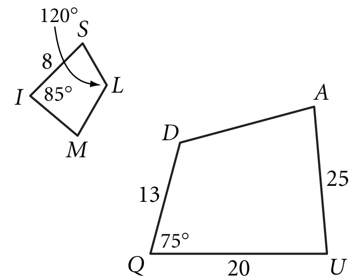
$SL =$ _____

$MI =$ _____

$m\angle D =$ _____

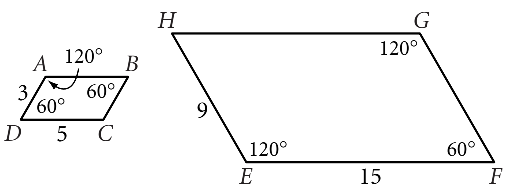
$m\angle U =$ _____

$m\angle A =$ _____

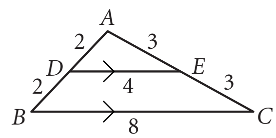


In Exercises 3–6, decide whether or not the figures are similar. Explain why or why not.

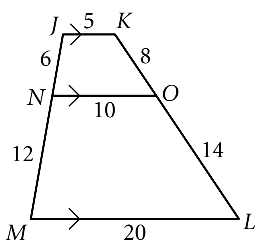
3. *ABCD* and *EFGH*



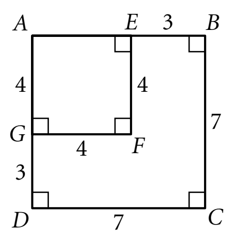
4. $\triangle ABC$ and $\triangle ADE$



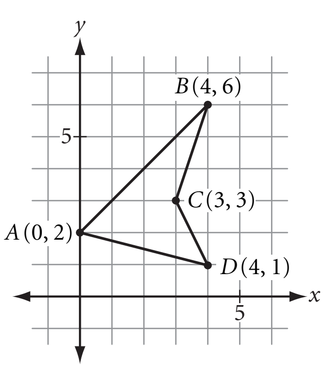
5. *JKON* and *JKLM*



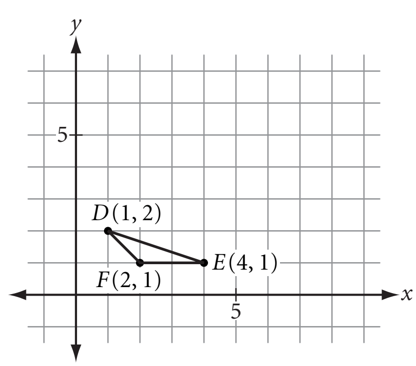
6. *ABCD* and *AEFG*



7. Draw the dilation of *ABCD* by a scale factor of $\frac{1}{2}$. What is the ratio of the perimeter of the dilated quadrilateral to the perimeter of the original quadrilateral?



8. Draw the dilation of $\triangle DEF$ by a scale factor of 2. What is the ratio of the area of the dilated triangle to the area of the original triangle?



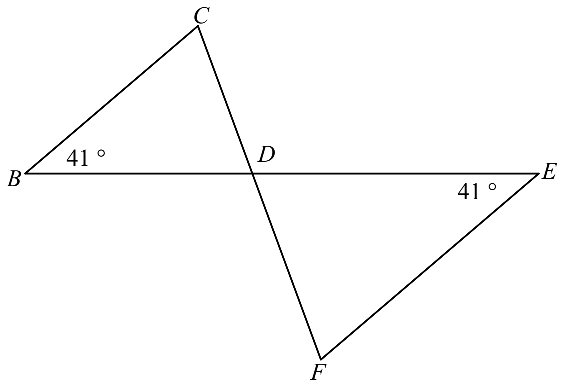
Geometry 1-2 Name: ______________________________

Practice: Similar Triangles

Date: ____________________ Period: ______

State if the triangles in each pair are similar. If so, state how you know they are similar.

1)



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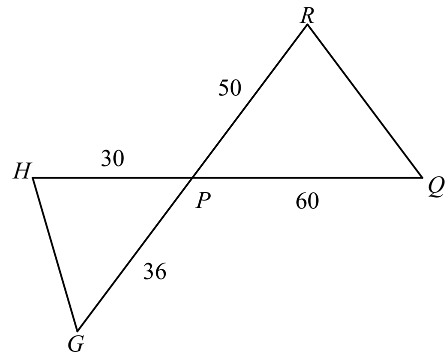

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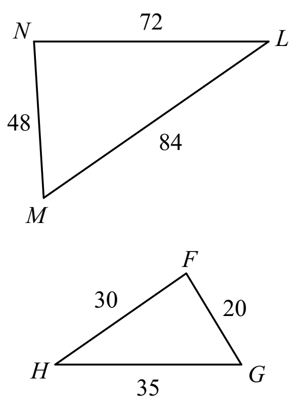

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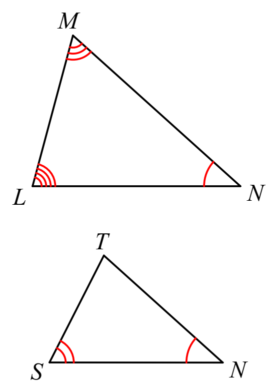
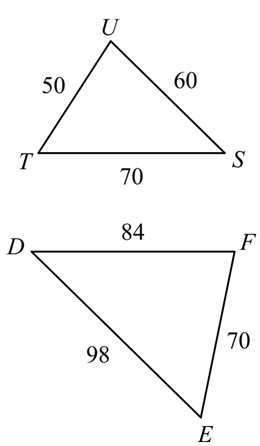


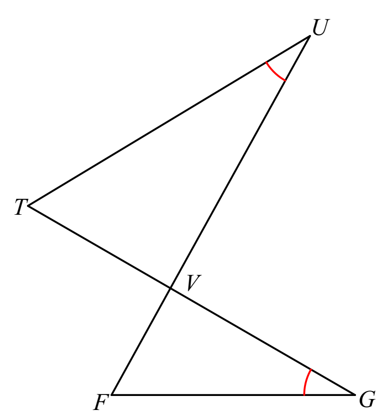
State if the triangles in each pair are similar. If so, complete the similarity statement.

5)



$\triangle DEF \sim$ ______

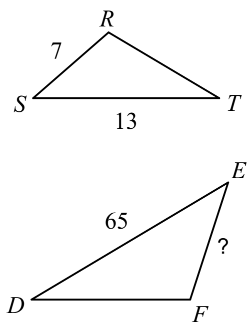
6)



$\triangle VUT \sim$ ______

Find the missing length. The triangles in each pair are similar.

7)



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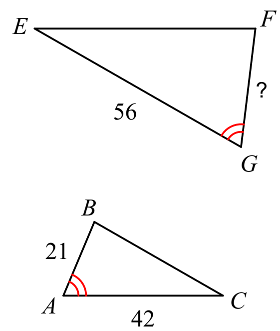

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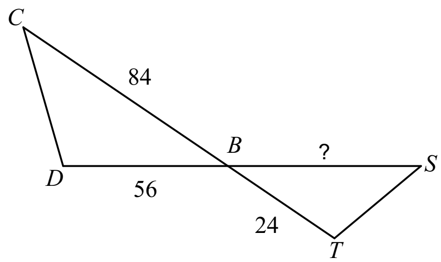

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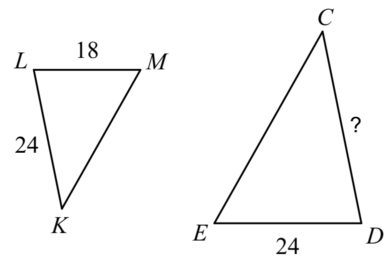
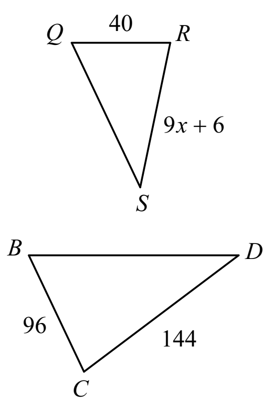


Solve for *x*. The triangles in each pair are similar.

11)



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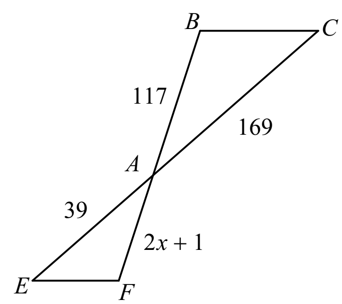


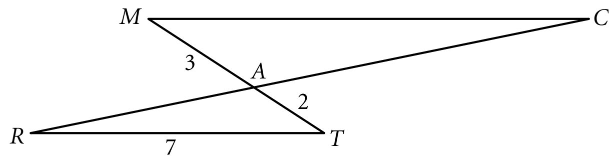
Lesson 11.2 • Similar Triangles

Name ____________________ Period __________ Date ____________

All measurements are in centimeters.

1. $\triangle TAR \sim \triangle MAC$

$MC =$ _____

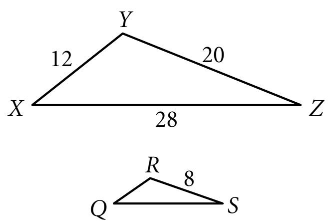


2. $\triangle XYZ \sim \triangle QRS$

$\angle Q \cong$ _____

$QR =$ _____

$QS =$ _____

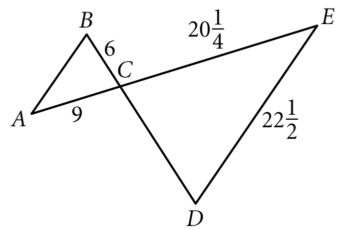


3. $\triangle ABC \sim \triangle EDC$

$\angle A \cong$ _____

$CD =$ _____

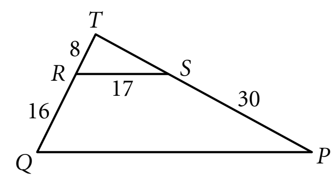
$AB =$ _____



4. $\triangle TRS \sim \triangle TQP$

$TS =$ _____

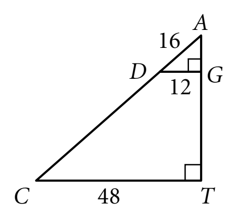
$QP =$ _____



For Exercises 5 and 6, refer to the figure at right.

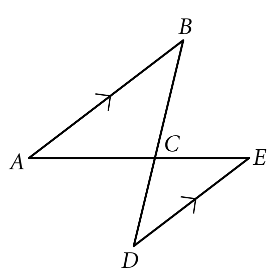
5. Explain why $\triangle CAT$ and $\triangle DAG$ are similar.

6. $CA =$ _____



In Exercises 7–9, identify similar triangles and explain why they are similar.

7.



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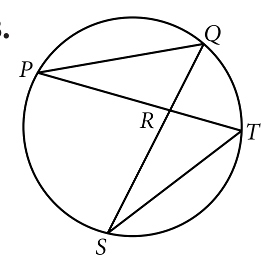

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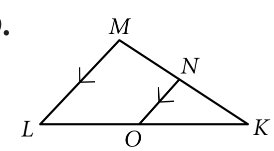


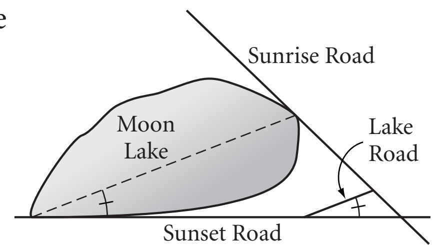
Lesson 11.3 • Indirect Measurement with Similar Triangles

Name ______________________________ **Period** ____________ **Date** ______________

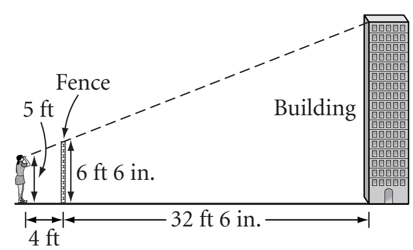
1. At a certain time of day, a 6 ft man casts a 4 ft shadow. At the same time of day, how tall is a tree that casts an 18 ft shadow?

2. Driving through the mountains, Dale has to go up and over a high mountain pass. The road has a constant incline for $7\frac{3}{4}$ miles to the top of the pass. Dale notices from a road sign that in the first mile he climbs 840 feet. How many feet does he climb in all?

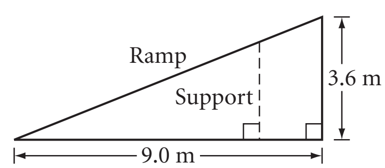
3. Sunrise Road is 42 miles long between the edge of Moon Lake and Lake Road and 15 miles long between Lake Road and Sunset Road. Lake Road is 29 miles long. Find the length of Moon Lake.



4. Marta is standing 4 ft behind a fence 6 ft 6 in. tall. When she looks over the fence, she can just see the top edge of a building. She knows that the building is 32 ft 6 in. behind the fence. Her eyes are 5 ft from the ground. How tall is the building? Give your answer to the nearest half foot.



5. You need to add 5 supports under the ramp, in addition to the 3.6 m one, so that they are all equally spaced. How long should each support be? (One is drawn in for you.)

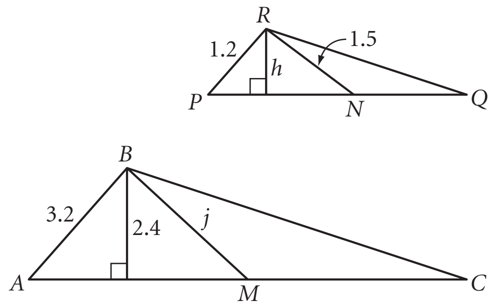


Lesson 11.4 • Corresponding Parts of Similar Triangles

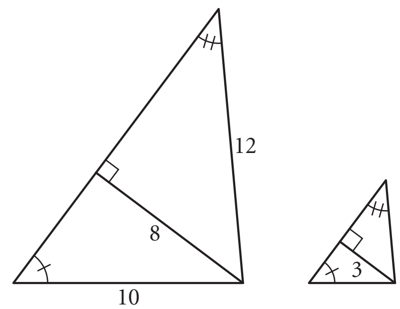
Name ______________________________ **Period** __________ **Date** ____________

All measurements are in centimeters.

1. $\triangle ABC \sim \triangle PRQ$. M and N are midpoints. Find h and j.



2. The triangles are similar. Find the length of each side of the smaller triangle to the nearest 0.01.

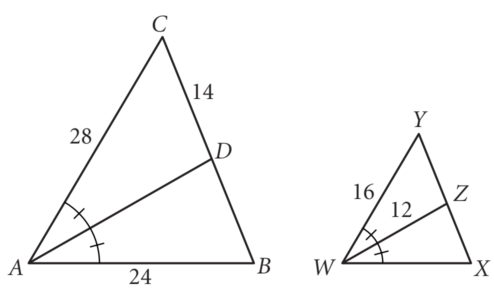


3. $\triangle ABC \sim \triangle WXY$

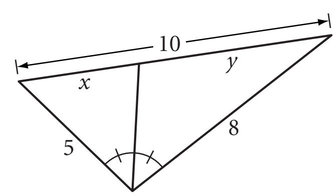
$WX =$ ______ $AD =$ ______

$DB =$ ______ $YZ =$ ______

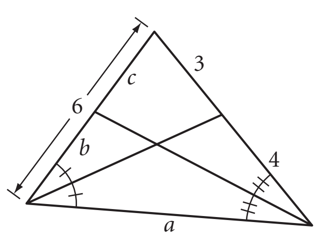
$XZ =$ ______



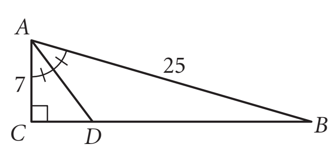
4. Find x and y.



5. Find a, b, and c.



6. Find CB, CD, and AD.

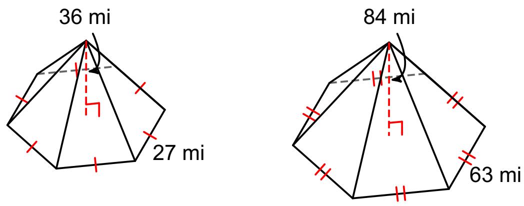


Geometry 1-2 Name: ____________________

Practice: Area Ratios & Volume Ratios

Date: ____________________ Period: ________

Determine if each pair of solids is similar.

1)


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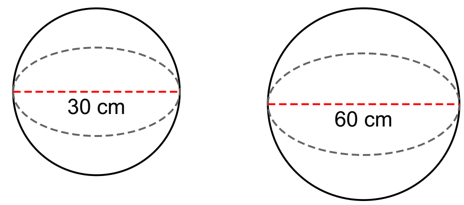

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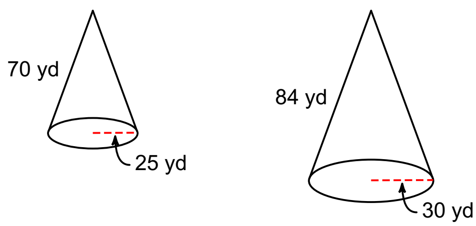

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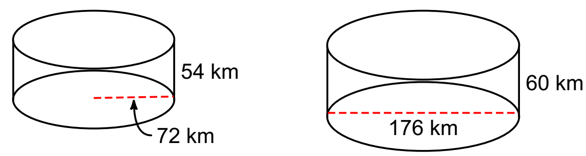
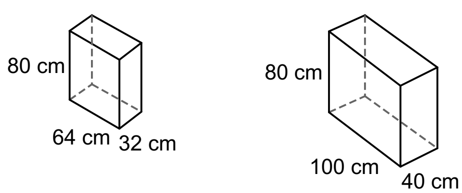


Each pair of figures is similar. Find the scale factor of the figure on the left to the figure on the right. Then find the ratio of surface areas and the ratio of volumes.

5)


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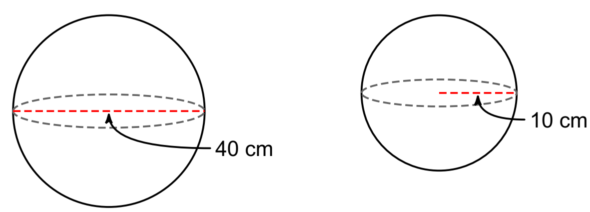
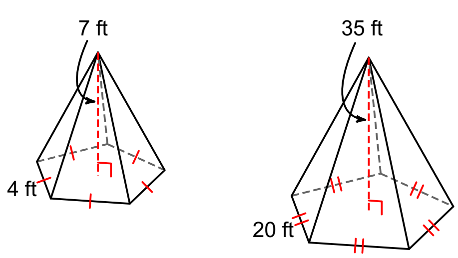
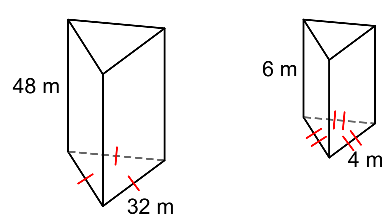
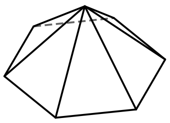


7)


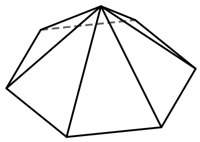
8)


Each pair of figures is similar. Use the information given to find the scale factor of the figure on the left to the figure on the right.

9)

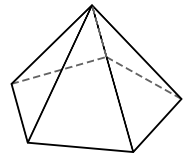


SA = 24 mi²

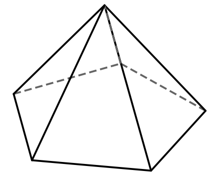


SA = 96 mi²

10)

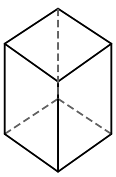


SA = 72 m²

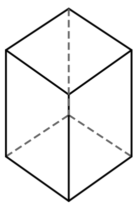


SA = 162 m²

11)

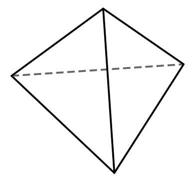


SA = 10 ft²

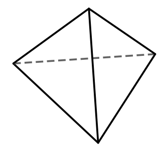


SA = 640 ft²

12)

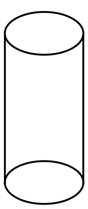


SA = 1400 km²

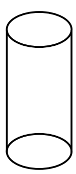


SA = 686 km²

13)

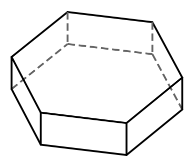


V = 1216π cm³

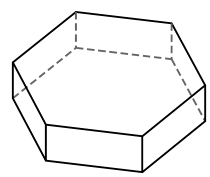


V = 513π cm³

14)

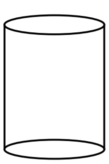


V = 11264 ft³

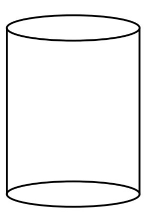


V = 16038 ft³

15)

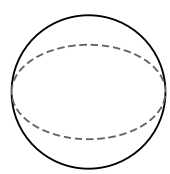


V = 5184π cm³

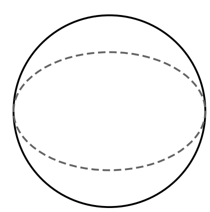


V = 17496π cm³

16)



V = 8π mi³



V = 64π mi³

The scale factor between two similar figures is given. The surface area and volume of the smaller figure are given. Find the surface area and volume of the larger figure.

17) scale factor = 1 : 9
SA = 18 yd^2
V = 18 yd^3

18) scale factor = 3 : 10
SA = 45 km^2
V = 432 km^3

19) scale factor = 1 : 2
SA = 80 km^2
V = 1920 km^3

20) scale factor = 1 : 3
SA = 4 ft^2
V = 64 ft^3

Some information about the surface area and volume of two similar solids has been given. Find the missing value.

21) Solid #1
SA = 1620 km^2
V = 17496 km^3
Solid #2
SA = 1280 km^2
V = ?

22) Solid #1
SA = 171 ft^2
V = 405 ft^3
Solid #2
SA = 1900 ft^2
V = ?

23) Solid #1
SA = 324 m^2
V = 1296 m^3
Solid #2
SA = 729 m^2
V = ?

24) Solid #1
SA = 36 cm^2
V = 4752 cm^3
Solid #2
SA = 64 cm^2
V = ?

25) Solid #1
SA = 5 ft^2
V = 19 ft^3
Solid #2
SA = ?
V = 513 ft^3

26) Solid #1
SA = 16 km^2
V = 240 km^3
Solid #2
SA = ?
V = 810 km^3

27) Solid #1
SA = 504 km^2
V = 4752 km^3
Solid #2
SA = ?
V = 22000 km^3

28) Solid #1
SA = 684 yd^2
V = 1728 yd^3
Solid #2
SA = ?
V = 5832 yd^3

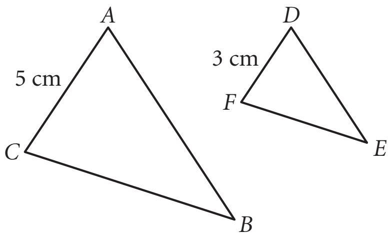
Lesson 11.5 • Proportions with Area

Name ______________________ **Period** __________ **Date** ____________

All measurements are in centimeters unless otherwise indicated.

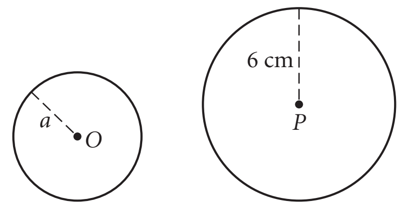
1. $\triangle ABC \sim \triangle DEF$. Area of $\triangle ABC = 15\ \text{cm}^2$.

Area of $\triangle DEF =$ _____

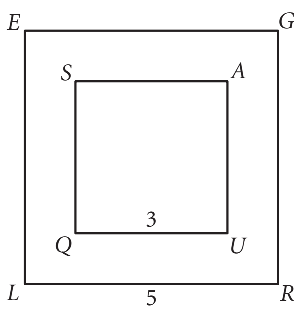


2. $\dfrac{\text{Area of circle } O}{\text{Area of circle } P} = \dfrac{4}{9}$.

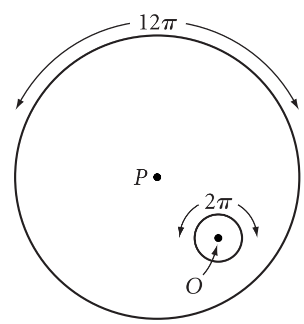
$a =$ _____



3. $\dfrac{\text{Area of square } SQUA}{\text{Area of square } LRGE} =$ _____

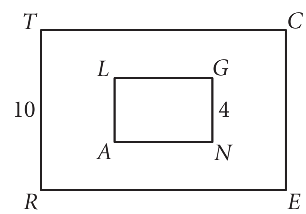


4. $\dfrac{\text{Area of circle } P}{\text{Area of circle } O} =$ _____



5. $RECT \sim ANGL$

$\dfrac{\text{Area of } RECT}{\text{Area of } ANGL} =$ _____



6. The ratio of the corresponding midsegments of two similar trapezoids is 4:5. What is the ratio of their areas?

7. The ratio of the areas of two similar pentagons is 4:9. What is the ratio of their corresponding sides?

8. If $ABCDE \sim FGHIJ$, $AC = 6$ cm, $FH = 10$ cm, and area of $ABCDE = 320\ \text{cm}^2$, then area of $FGHIJ =$ _____.

9. Stefan is helping his mother retile the kitchen floor. The tiles are 4-by-4-inch squares. The kitchen is square, and the area of the floor is 144 square feet. Assuming the tiles fit snugly (don't worry about grout), how many tiles will be needed to cover the floor?

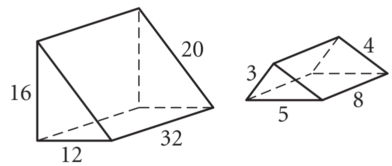
Lesson 11.6 • Proportions with Volume

Name ______________________ **Period** __________ **Date** ______________

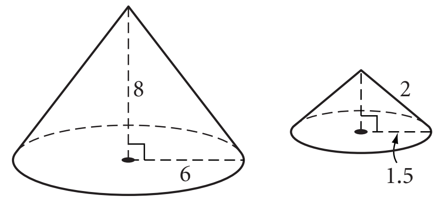
All measurements are in centimeters unless otherwise indicated.

In Exercises 1 and 2, decide whether or not the two solids are similar.

1.



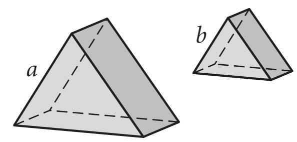
2.



3. The triangular prisms are similar and the ratio of a to b is $\frac{5}{2}$.

Volume of large prism $= 250\text{ cm}^3$

Volume of smaller prism $=$ _____

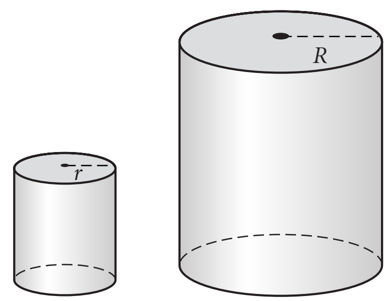


4. The right cylinders are similar and $r = 10$ cm.

Volume of large cylinder $= 64$ cm

Volume of small cylinder $= 8$ cm

$R =$ _______



5. The corresponding heights of two similar cylinders is 2 : 5. What is the ratio of their volumes?

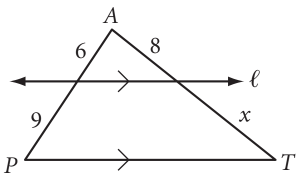
6. A rectangular prism aquarium holds 64 gallons of water. A similarly shaped aquarium holds 8 gallons of water. If a 1.5 ft^2 cover fits on the smaller tank, what is the area of a cover that will fit on the larger tank?

Lesson 11.7 • Proportional Segments Between Parallel Lines

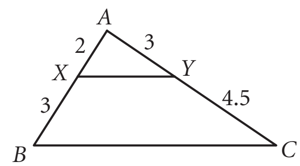
Name ______________________________ **Period** __________ **Date** ____________

All measurements are in centimeters.

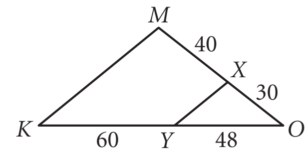
1. $x =$ _____



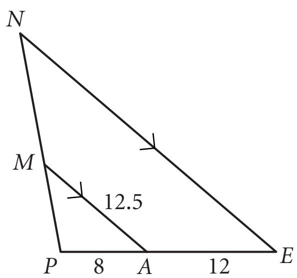
2. Is $\overline{XY} \parallel \overline{BC}$?



3. Is $\overline{XY} \parallel \overline{MK}$?



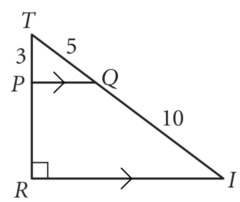
4. $NE =$ _____



5. $PR =$ _____

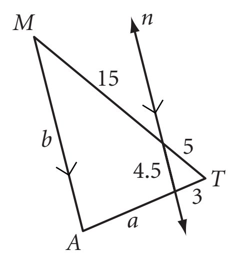
$PQ =$ _____

$RI =$ _____



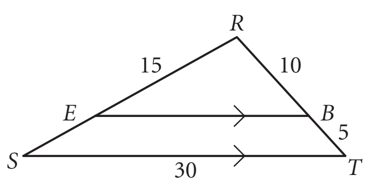
6. $a =$ _____

$b =$ _____



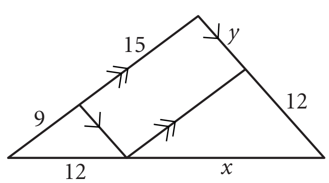
7. $RS =$ _____

$EB =$ _____



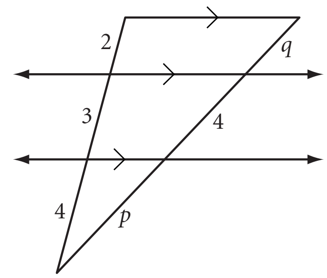
8. $x =$ _____

$y =$ _____



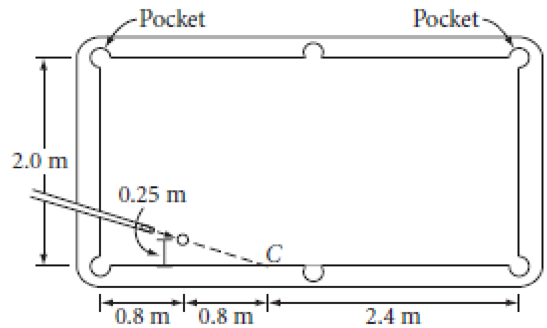
9. $p =$ _____

$q =$ _____



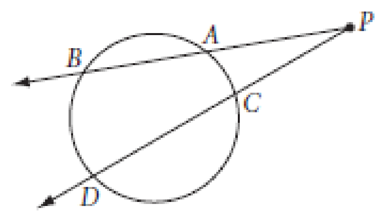
Unit 11 • Challenge Problems

1. (*Target 11a, 11b & 11c*)
Suppose the ball shown on this pool table is hit so that it strikes point C. Trace the path of the ball. Locate the point of contact with each side the ball hits. Will the ball go into the pocket?



Explain your reasoning.

2. (*Target 11b & 11d*)
Construct a circle and an exterior point P on your paper. From point P, draw two secant rays, one intersecting the circle at A and B, the other intersecting the circle at C and D, as shown.



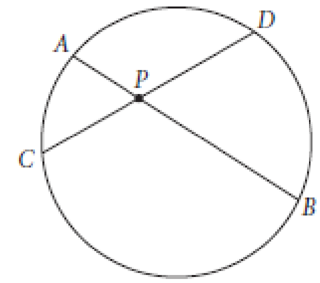
a. Measure PA and PB and calculate the product $PA \cdot PB$. Measure PC and PD and calculate the product $PC \cdot PD$. Compare the two products.

b. Explain why $\Delta PBC \sim \Delta PDA$.

c. Explain why $PA \cdot PB = PC \cdot PD$.

Unit 11 • Challenge Problems

3. (*Target 11b & 11d*)
Construct a circle and a point P in the interior of the circle. Draw two chords $\overline{AB}$ and $\overline{CD}$ through P.



a. Measure PA and PB and calculate the product $PA \cdot PB$.
Measure PC and PD and calculate the product $PC \cdot PD$.
Compare the two products.

b. Explain why $\Delta PBC \sim \Delta PDA$.

c. Explain why $PA \cdot PB = PC \cdot PD$.

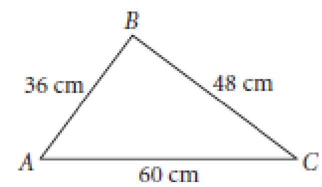
4. (*Target 11b & 11c*)
A structural engineer needs to design a circular arch (that is, an arch that is an arc of a circle) that spans 30 ft and reaches a height of 10 ft.

a. Sketch and label the circle that contains the arch as an arc. Label the height and span of the arch.

b. Find the radius of the circle. Explain your reasoning.

Unit 11 • Challenge Problems

5. (*Targets 11e*)
   A copy machine has a setting that allows the user to enlarge or reduce an original by specifying a percentage. For example, if the 75% setting is used, the length of each segment in the image will be 75% of the length of the original segment.

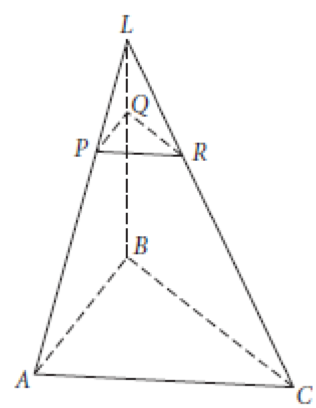


   a. What is the area of the image of ΔABC if it is copied using a 50% setting? A 125% setting? An 80% setting? Explain how you found your answers.

   b. If you want to double the area of the triangle, what setting, to the nearest percent, should you use? Show and explain your work.

   c. If you want to fit the image on a 14 cm-by-19 cm piece of paper, so that it fills as much of the paper as possible, what setting, to the nearest percent, should you use? Explain your reasoning.

6. (*Target 11b & 11e*)
   In this triangular pyramid, LA= 12 cm, LB = 8 cm, LC = 16 cm, and LP = 3 cm. ΔPQR is a cross section parallel to the base of the pyramid, creating a smaller triangular pyramid with base ΔPQR and vertex L.



   a. Find *PA, LQ, QB, LR,* and *RC*.

   b. Find the ratios below and explain how you found them.

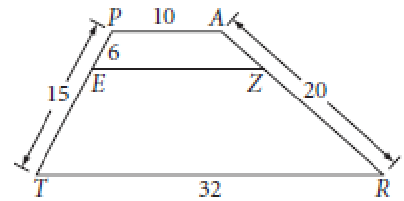
   $$\frac{surface\ area\ of\ small\ pyramid}{surface\ area\ of\ large\ pyramid} = \_\_\_\_\_\_\_\_$$

   $$\frac{volume\ of\ small\ pyramid}{volume\ of\ large\ pyramid} = \_\_\_\_\_\_\_\_$$

   c. Explain why $\Delta PQR \sim \Delta ABC$.

Unit 11 • Challenge Problems

7. (*Target 11f*)
Trapezoid *TRAP* is cut by $\overline{EZ}$ parallel to the bases and *EP* = 6.
All measurements are in inches.



a. Find *AZ* and explain how you found it.

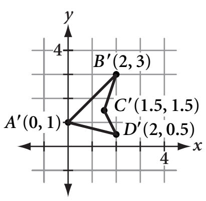
b. Extend $\overline{TP}$ and $\overline{RA}$ until they intersect at O. Why is $\Delta OPA \sim \Delta OTR$? What is the ratio of the corresponding sides?

c. Find *OP* and *OA* and explain how you found them.

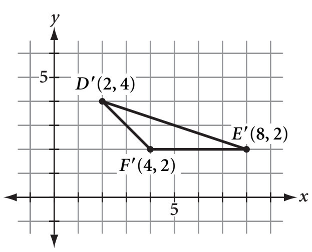
d. Find *EZ* and explain how you found it.

LESSON 11.1 • Similar Polygons

1. $AP = 8$ cm; $EI = 7$ cm; $SN = 15$ cm; $YR = 12$ cm
2. $SL = 5.2$ cm; $MI = 10$ cm; $m\angle D = 120°$; $m\angle U = 85°$; $m\angle A = 80°$
3. Yes. All corresponding angles are congruent. Both figures are parallelograms, so opposite sides within each parallelogram are equal. The corresponding sides are proportional $\left(\frac{15}{5} = \frac{9}{3}\right)$.
4. Yes. Corresponding angles are congruent by the CA Conjecture. Corresponding sides are proportional $\left(\frac{2}{4} = \frac{3}{6} = \frac{4}{8}\right)$.
5. No. $\frac{6}{18} \neq \frac{8}{22}$.
6. Yes. All angles are right angles, so corresponding angles are congruent. The corresponding side lengths have the ratio $\frac{4}{7}$, so corresponding side lengths are proportional.
7. $\frac{1}{2}$



8. 4 to 1



LESSON 11.2 • Similar Triangles

1. $MC = 10.5$ cm
2. $\angle Q \cong \angle X$; $QR = 4.8$ cm; $QS = 11.2$ cm
3. $\angle A \cong \angle E$; $CD = 13.5$ cm; $AB = 10$ cm
4. $TS = 15$ cm; $QP = 51$ cm
5. AA Similarity Conjecture
6. $CA = 64$ cm
7. $\triangle ABC \sim \triangle EDC$. Possible explanation: $\angle A \cong \angle E$ and $\angle B \cong \angle D$ by AIA, so by the AA Similarity Conjecture, the triangles are similar.
8. $\triangle PQR \sim \triangle STR$. Possible explanation: $\angle P \cong \angle S$ and $\angle Q \cong \angle T$ because each pair is inscribed in the same arc, so by the AA Similarity Conjecture, the triangles are similar.
9. $\triangle MLK \sim \triangle NOK$. Possible explanation: $\angle MLK \cong \angle NOK$ by CA and $\angle K \cong \angle K$ because they are the same angle, so by the AA Similarity Conjecture, the two triangles are similar.

LESSON 11.3 • Indirect Measurement with Similar Triangles

1. 27 ft
2. 6510 ft
3. 110.2 mi
4. About 18.5 ft
5. 0.6 m, 1.2 m, 1.8 m, 2.4 m, and 3.0 m

LESSON 11.4 • Corresponding Parts of Similar Triangles

1. $h = 0.9$ cm; $j = 4.0$ cm
2. 3.75 cm, 4.50 cm, 5.60 cm
3. $WX = 13\frac{5}{7} \approx 13.7$ cm; $AD = 21$ cm; $DB = 12$ cm; $YZ = 8$ cm; $XZ = 6\frac{6}{7} \approx 6.9$ cm
4. $x = \frac{50}{13} \approx 3.85$ cm; $y = \frac{80}{13} \approx 6.15$ cm
5. $a = 8$ cm; $b = 3.2$ cm; $c = 2.8$ cm
6. $CB = 24$ cm; $CD = 5.25$ cm; $AD = 8.75$ cm

LESSON 11.5 • Proportions with Area

1. 5.4 cm^2
2. 4 cm
3. $\frac{9}{25}$
4. $\frac{36}{1}$
5. $\frac{25}{4}$
6. 16:25
7. 2:3
8. $888\frac{8}{9}$ cm^2
9. 1296 tiles

LESSON 11.6 • Proportions with Volume

1. Yes
2. No
3. 16 cm^3
4. 20 cm
5. 8:125
6. 6 ft^2

LESSON 11.7 • Proportional Segments Between Parallel Lines

1. $x = 12$ cm
2. Yes
3. No
4. $NE = 31.25$ cm
5. $PR = 6$ cm; $PQ = 4$ cm; $RI = 12$ cm
6. $a = 9$ cm; $b = 18$ cm
7. $RS = 22.5$ cm, $EB = 20$ cm
8. $x = 20$ cm; $y = 7.2$ cm
9. $p = \frac{16}{3} = 5.\overline{3}$ cm; $q = \frac{8}{3} = 2.\overline{6}$ cm

Answers to Practice: Similar Polygons

1) similar
2) similar
3) similar
4) similar
5) $\left\{\frac{27}{5}\right\}$
6) $\{2\}$
7) $\left\{\frac{14}{5}\right\}$
8) $\{50\}$
9) $\left\{\frac{39}{5}\right\}$
10) $\left\{-\frac{9}{5}\right\}$
11) 1 : 2
12) 5 : 6
13) 1 : 4
14) 1 : 4
15) 10
16) 8
17) 15
18) 15

Answers to Practice: Similar Triangles

1) similar; AA similarity
2) similar; SAS similarity
3) similar; SSS similarity
4) not similar
5) similar; $\triangle STU$
6) similar; $\triangle VGF$
7) 35
8) 28
9) 36
10) 32
11) 6
12) 13

Answers to Practice: Area Ratios & Volume Ratios

1) Yes
2) Yes
3) Yes
4) No
5) 4 : 5, 16 : 25, 64 : 125
6) 2 : 1, 4 : 1, 8 : 1
7) 1 : 5, 1 : 25, 1 : 125
8) 8 : 1, 64 : 1, 512 : 1
9) 1 : 2
10) 2 : 3
11) 1 : 8
12) 10 : 7
13) 4 : 3
14) 8 : 9
15) 2 : 3
16) 1 : 2
17) SA = 1458 yd^2, V = 13122 yd^3
18) SA = 500 km^2, V = 16000 km^3
19) SA = 320 km^2, V = 15360 km^3
20) SA = 36 ft^2, V = 1728 ft^3
21) V = 12288 km^3
22) V = 15000 ft^3
23) V = 4374 m^3
24) V = 11264 cm^3
25) SA = 45 ft^2
26) SA = 36 km^2
27) SA = 1400 km^2
28) SA = 1539 yd^2