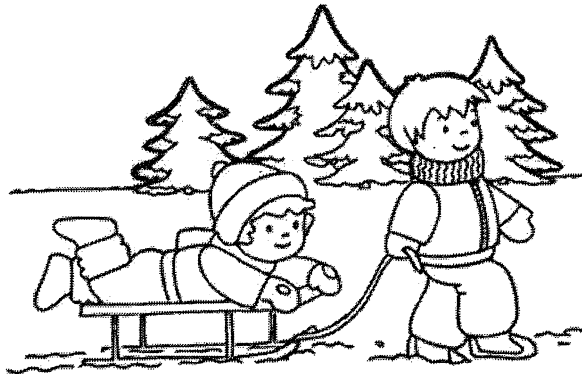


## Unit 2: Similarity and Trigonometry

I CAN:

- write a similarity statement for two polygons
- use proportions to solve problems involving similar figures
- determine the scale factor for a pair of similar figures, given an image or ordered pairs
- create a dilation (enlargement or reduction), given the scale factor
- solve problems using the Triangle Midsegment Theorem (name a parallel side, find a missing segment length)
- determine and/or prove whether triangles are similar using Angle-Angle Similarity Postulate, Side-Side-Side, and Side-Angle-Side Similarity Theorems
- use trigonometric ratios ( $\sin \theta = \frac{opp}{hyp}$ ,  $\cos \theta = \frac{adj}{hyp}$ ,  $\tan \theta = \frac{opp}{adj}$ ) to solve problems



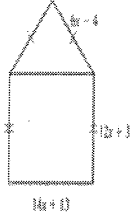
*goodbye. January..hello. February*

Monday	Tuesday	Wednesday	Thursday	Friday
20	21	22	23	24 Begin Unit 2  Dilations and Scale Factor
27 Dilations and Similar Triangles Applications	28 Triangle Midsegment Theorem & Triangle Proportionality Theorem	29 Midsegment and Proportionality Review / Proving Triangles Similar	30 <b>Similarity and Midsegment Quiz/</b>  Trig Ratios	31 Right Triangle Trig SOHCAHTOA – Ratios and Complementary Angles
3 Trig and Solving for Missing Sides & Angles	4 Trig: Multi-step Problems and Co-functions	5 <b>Trig Quiz/</b>  Trig Applications, Angles of Elevation and Depression	6 Review / <b>CTLS Touchstone Quiz</b>	7 <b>Unit 2 Test</b>

28.

A model of a house is shown. What is the perimeter, in units, of the model?

- A.  $32x + 12$                       C.  $50x + 11$   
 B.  $46x + 25$                       D.  $64x + 24$

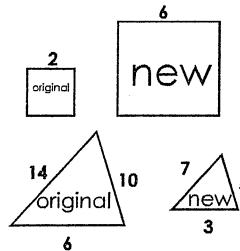


**Scale Factor** – the \_\_\_\_\_ of a new image to its original image  
 Find by using the ratio of \_\_\_\_\_

## Scale Factor

- WHEN SCALE FACTOR IS \_\_\_\_\_ 1, THE SHAPE GETS BIGGER (\_\_\_\_\_).
- WHEN SCALE FACTOR IS \_\_\_\_\_ THAN 1, BUT \_\_\_\_\_ THAN 0, THE SHAPE GETS SMALLER (\_\_\_\_\_).

### SCALE FACTOR.



Find the coordinates of the dilation image for the given scale factor,  $k$ .

Example 1:

$G(0, -2)$ ,  $H(1, 3)$ , and  $I(4, 1)$ ;  $k = 2$

All you do is \_\_\_\_\_  $k$  to  $(x, y)$ .

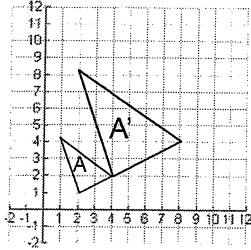
Find the coordinates of the dilation image for the given scale factor,  $k$ .

Example 2:

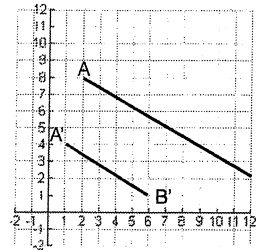
$L(8, -8)$ ,  $N(0, 16)$ , and  $M(4, 5)$ ;  $k = 1/4$

All you do is \_\_\_\_\_  $k$  to  $(x, y)$ .

Identify the scale factor of the following dilation.

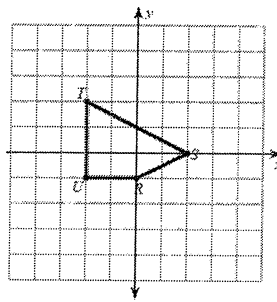


Identify the scale factor of the following dilation.



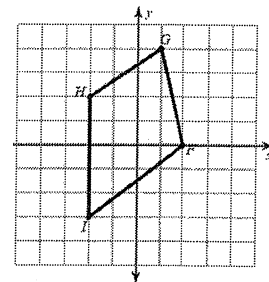
Graph the given dilation.

dilation of 2 about the origin



Graph the given dilation.

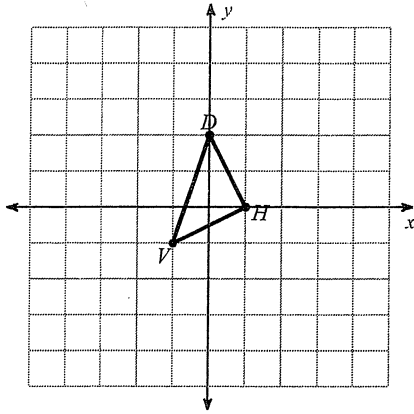
dilation of  $\frac{1}{2}$  about the origin



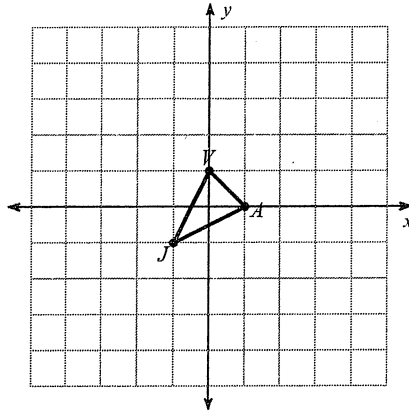
# Dilations

Graph the image of the figure using the transformation given.

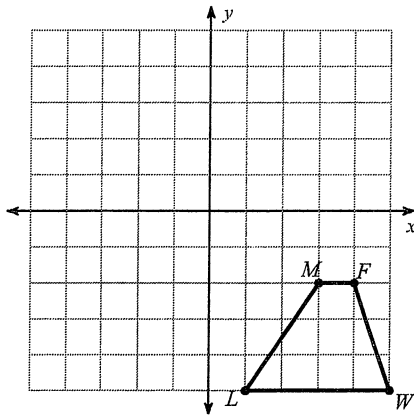
1) dilation of 2



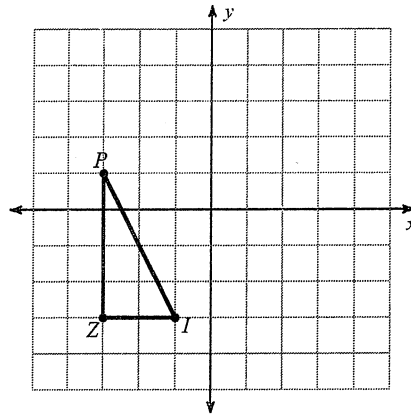
2) dilation of 4



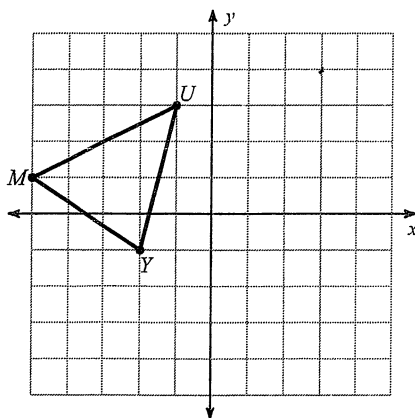
3) dilation of  $\frac{1}{2}$



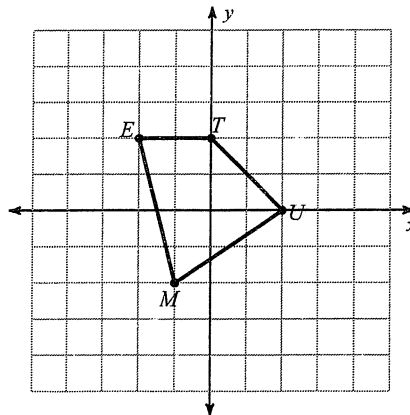
4) dilation of 1.5



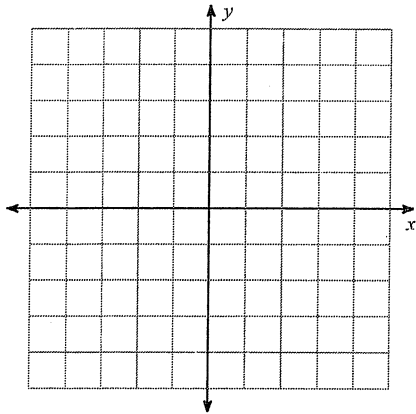
5) dilation of  $\frac{1}{2}$



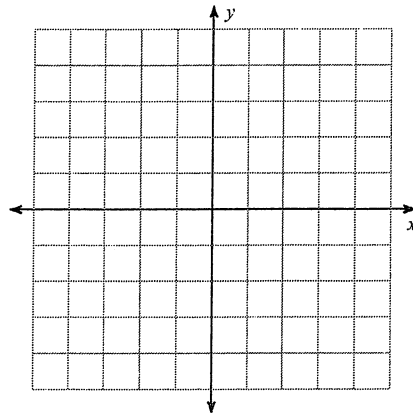
6) dilation of 2



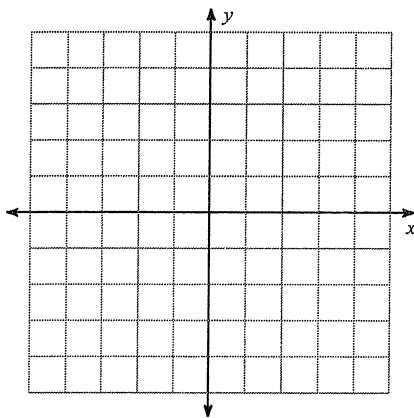
- 7) dilation of 2  
 $K(-1, 0), C(1, 2), U(0, -2)$



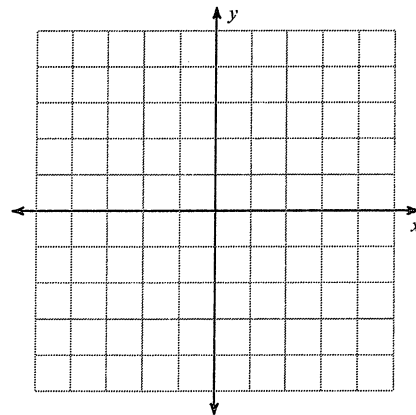
- 8) dilation of 2.5  
 $Z(-1, 0), G(0, 2), E(1, 2), W(-1, -1)$



- 9) dilation of 1.5  
 $L(-1, -1), K(-2, 1), Q(3, 1)$

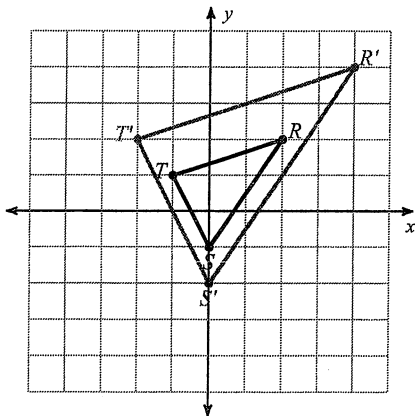


- 10) dilation of  $\frac{1}{4}$   
 $V(-4, 2), M(-4, 4), S(0, 4)$

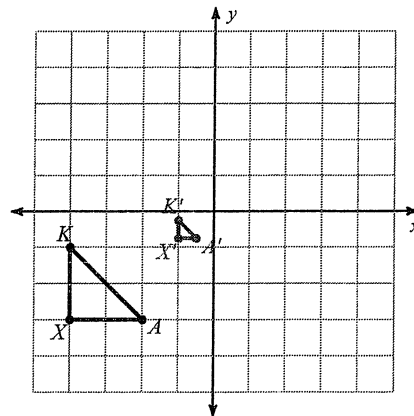


Write a rule to describe each transformation.

11)



12)



50. In this figure,  $\overline{KN} \perp \overline{EM}$ .

What information would a student need to prove  $\triangle KEN \sim \triangle MEN$ ?

- A  $\angle ENK \cong \angle ENM$
- B  $\angle ENK \cong \angle ENM$
- C  $\angle KEN \cong \angle MEN$
- D  $\angle KEM \cong \angle ENM$

1

# Similar Polygons

2

## Similar Polygons

1. Corresponding angles are \_\_\_\_\_
2. Corresponding sides are \_\_\_\_\_

3

## Similarity Statement

4

Solve for x and y.

5

$ABCD \sim EFGH$ . Solve for x.

6

Ex. A tree cast a shadow 18 feet long. At the same time a person who is 6 feet tall cast a shadow 4 feet long. How tall is the tree?

7

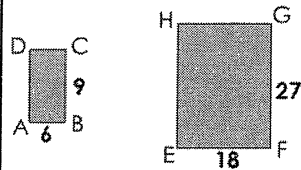
### Ratio of Similar Polygons

Corresponding Sides : Corresponding Sides

same as

Perimeter : Perimeter

**A : B**

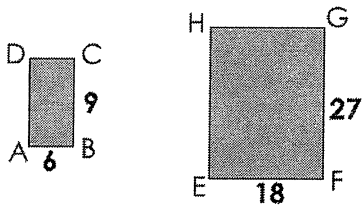


8

### Ratio of Similar Polygons

Area : Area

**A<sup>2</sup> : B<sup>2</sup>**

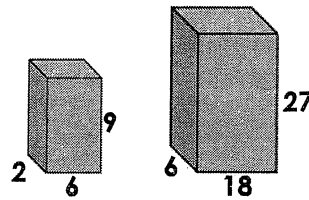


9

### Ratio of Similar Figures

Volume : Volume

**A<sup>3</sup> : B<sup>3</sup>**

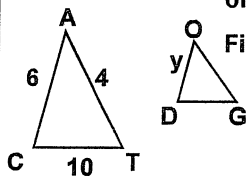


10

The ratio of the perimeters of two similar polygons equals the ratio of any pair of corresponding sides

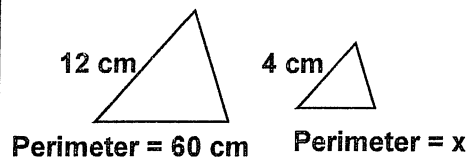
The ratio of the perimeters of CAT to DOG is 3:2

Find the value of y.



11

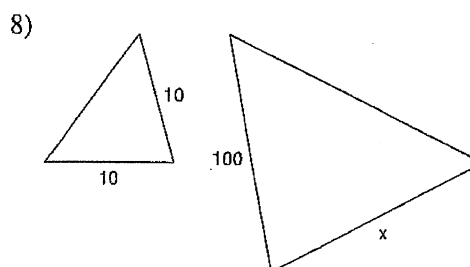
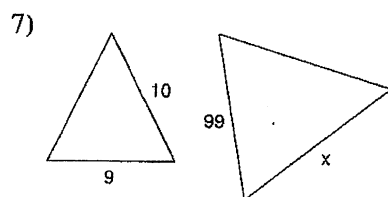
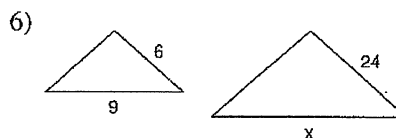
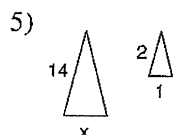
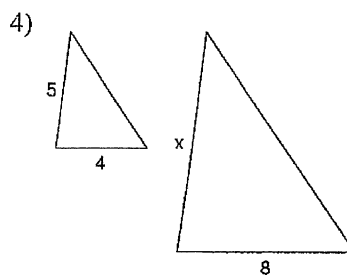
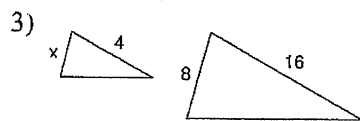
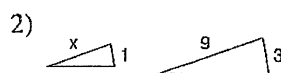
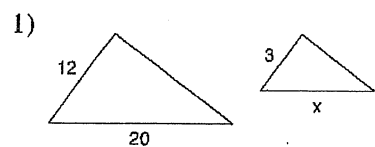
Find the perimeter of the smaller triangle.



12

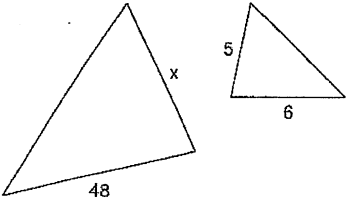
Similar Figures

Each pair of figures is similar. Find the missing side.

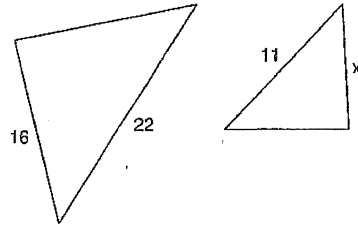




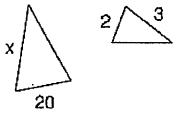
9)



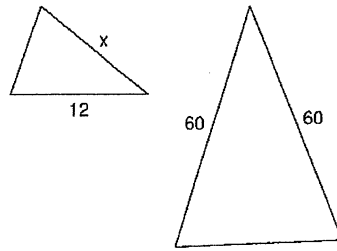
10)



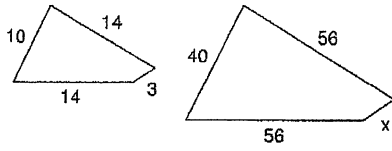
11)



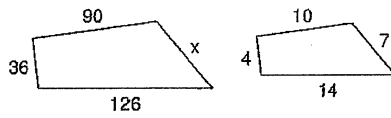
12)



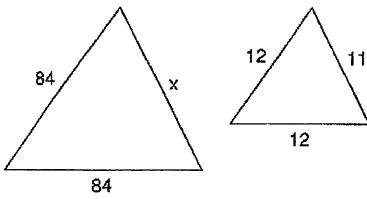
13)



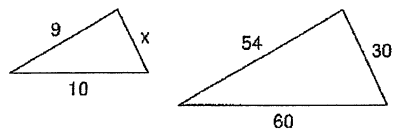
14)



15)



16)

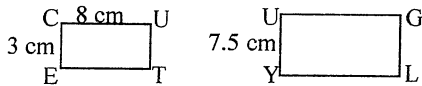


Name: \_\_\_\_\_ Date: \_\_\_\_\_

**SIMILARITY OF TRIANGLES & RECTANGLES**

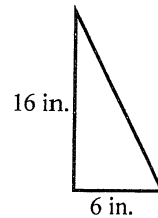
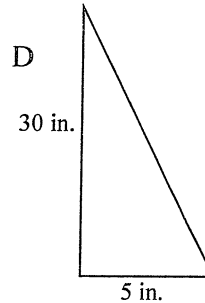
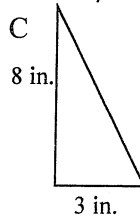
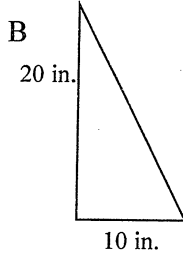
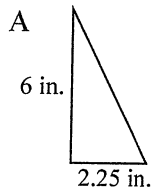
**Dilations as Proportions**

**Ex)** Rectangle CUTE was dilated to create rectangle UGLY. Find the length of LY.

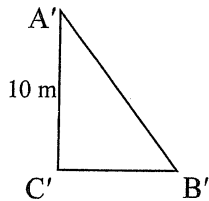
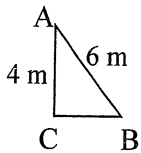


**Ex)** Determine which of the following figures could be a dilation of the triangle to the right.

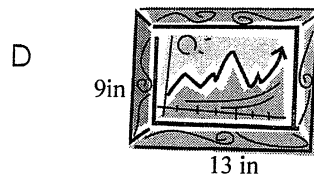
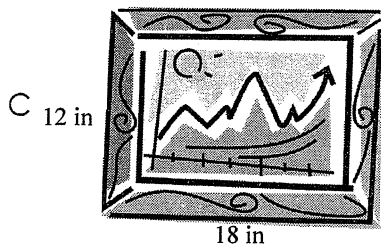
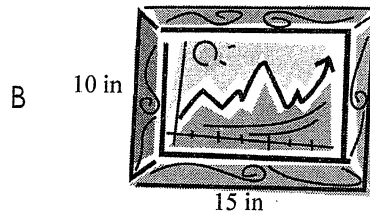
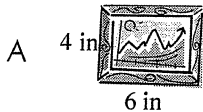
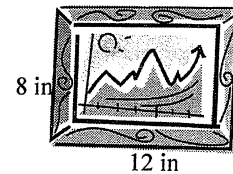
(There could be more than one answer)



1. Find the length of  $\overline{A'B'}$  after the dilation.



2. Which of the following could **NOT** be an enlargement or reduction (dilation) of the original painting shown at right?



**Word Problems:**

Write the equation for each and solve. Show all work.

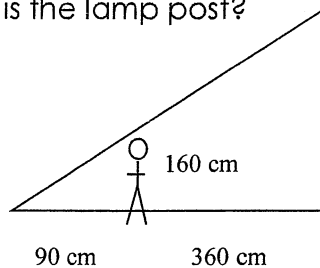
1. Two rectangles are similar. The first is 4 in. wide and 15 in. long. The second is 9 in. wide.

- Find the length of the second rectangle.
- How do the perimeters of the two rectangles compare? How does this compare to the scale factor?
- How do the areas of the two rectangles compare? How does this compare to the scale factor?

2. Two triangles are similar. The first has a base of 12 in. and a height of 8 in. The second has a base of 30 inches.

- Find the height of the triangle.
- How do the areas of the two triangles compare? How does this compare to the scale factor?

- 3) A girl 160 cm tall, stands 360 cm from a lamp post at night. Her shadow from the light is 90 cm long. How high is the lamp post?



Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Similarity and Dilations**

In the diagram,  $\triangle CAT \sim \triangle DOG$ . Use the diagram to find each of the following.

1. Scale factor of  $\triangle CAT$  to  $\triangle DOG$  (Simplify.)

Scale Factor = \_\_\_\_\_

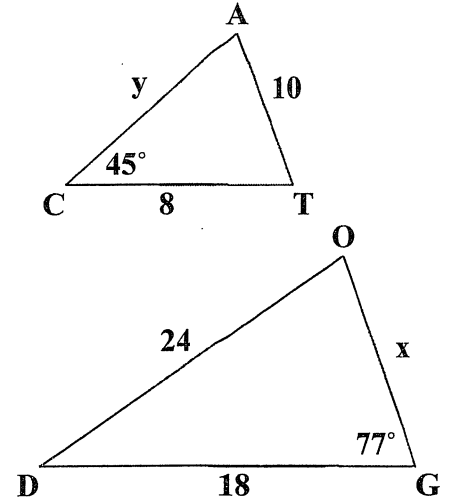
2. Find  $x$  and  $y$  (Show Work!)

$x =$  \_\_\_\_\_  $y =$  \_\_\_\_\_

3. Find  $m\angle D =$  \_\_\_\_\_ $^\circ$

4. Find  $m\angle O =$  \_\_\_\_\_ $^\circ$

5. Find  $m\angle A =$  \_\_\_\_\_ $^\circ$

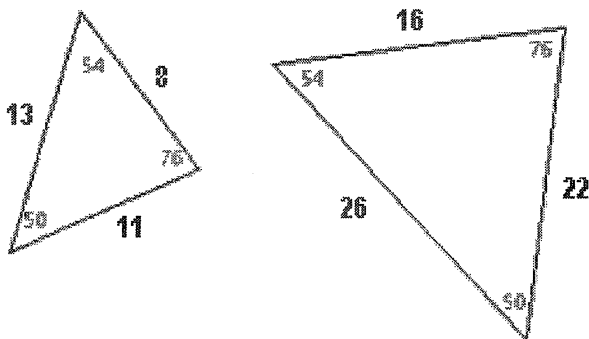


6. What is the ratio of the perimeter of  $\triangle CAT$  to the perimeter of  $\triangle DOG$ ? \_\_\_\_\_

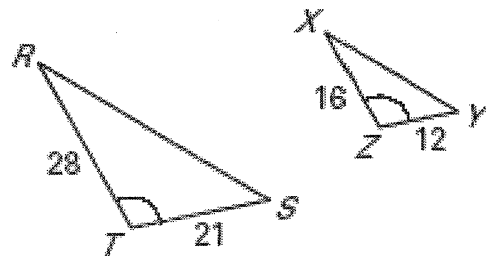
7. A boy who is 6 ft. tall cast a shadow that is 15 ft long. At the same time, a building nearby cast a shadow that is 186 ft long. How tall is the building? Draw a picture!

Explain why the triangles are similar and write a similarity statement.

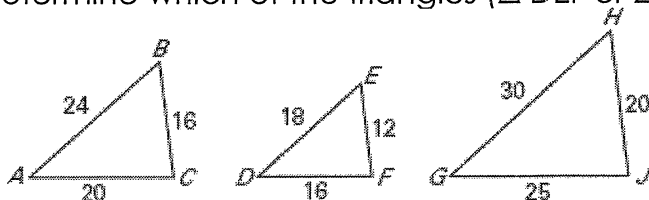
8.  $\triangle BAC \sim$  \_\_\_\_\_



9.  $\triangle TRS \sim$  \_\_\_\_\_



Determine which of the triangles ( $\triangle DEF$  or  $\triangle GHJ$ ) is similar to  $\triangle ABC$ :

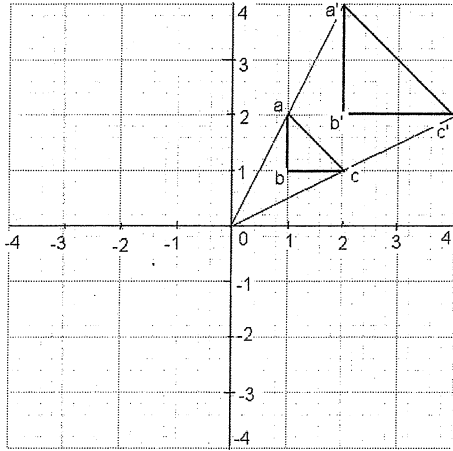


10. Complete the Similarity Statement to  $\triangle CBA \sim \triangle$  \_\_\_\_\_

11. Find the Scale Factor = \_\_\_\_\_

Determine whether the dilation from Figure ABC to Figure A'B'C' is a reduction or an enlargement. Then find its scale factor and simplify if possible.

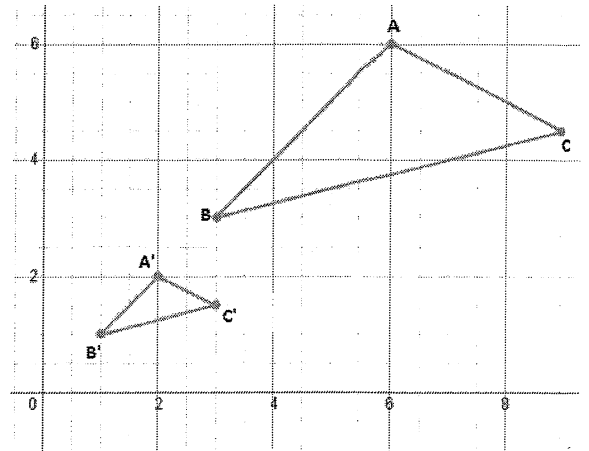
12.



Reduction or enlargement?

scale factor = \_\_\_\_\_

13.

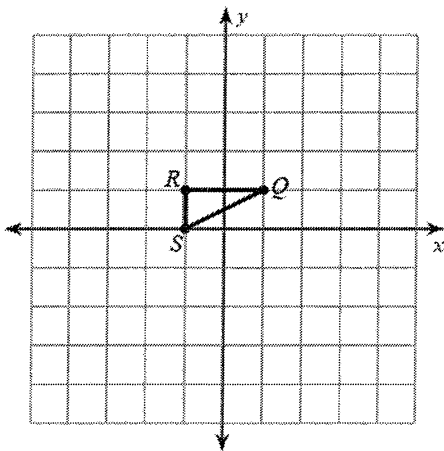


Reduction or enlargement?

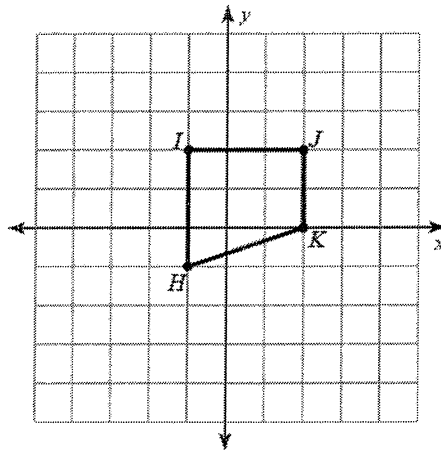
scale factor = \_\_\_\_\_

Graph the image of the figure using the transformation given.

14) dilation of 4 about the origin



15) dilation of  $\frac{1}{2}$  about the origin



Find the coordinates of the vertices of each figure after the given transformation. Identify if it is an enlargement or reduction.

16) dilation of  $\frac{1}{2}$  about the origin

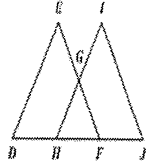
$R(-1, -1), S(0, 2), T(1, 2), U(2, -2)$

17) dilation of 2 about the origin

$Z(-1, -1), Y(-1, 2), X(1, 1)$

57. In this diagram,  $\overline{DE} \cong \overline{FI}$  and  $\angle D \cong \angle I$ . Which additional information is sufficient to prove that  $\triangle DEF$  is congruent to  $\triangle HIF$ ?

- A.  $\overline{EF} \cong \overline{IH}$
- B.  $\overline{DH} \cong \overline{IF}$
- C.  $\overline{HE} \cong \overline{GI}$
- D.  $\overline{HF} \cong \overline{IF}$



1

# Triangle Midsegment Theorem

2

Triangle Midsegment

1. \_\_\_\_\_ to one side of the triangle
2. Is \_\_\_\_\_ the length of the parallel side
3. Connects the \_\_\_\_\_

3

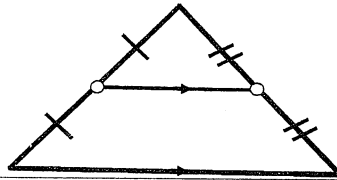
## Triangle Midsegment Theorem

### EQUATION

$$MIDSEGMENT = \frac{1}{2} \text{Parallel Side}$$

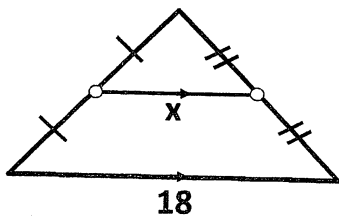
or

$$2(MIDSEGMENT) = \text{Parallel Side}$$



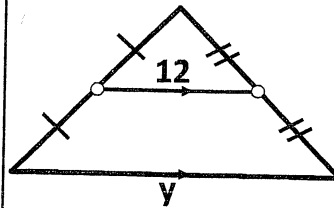
4

1. Solve for x.



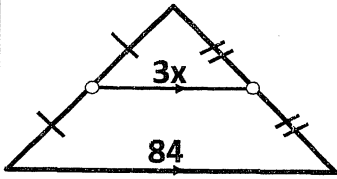
5

2. Solve for y.



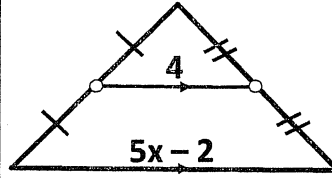
6

3. Solve for x.



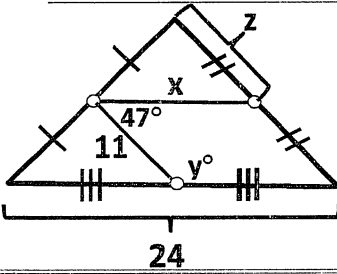
7

4. Solve for x.



8

5. Solve for the missing variables.



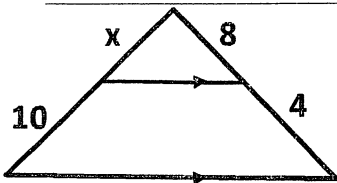
9

## Proportional Parts of Triangles

BE CONSISTENT WITH HOW YOU SET UP THE

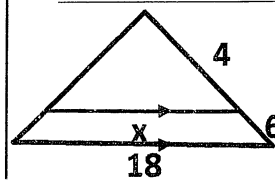
10

1. Solve for x.



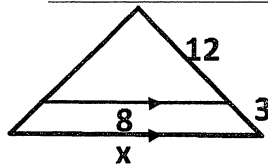
11

2. Solve for x.



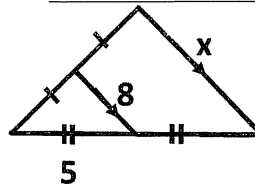
12

3. Solve for  $x$ .



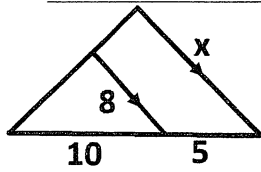
13

Determine if a midsegment or proportionality problem and solve.



14

Determine if a midsegment or proportionality problem and solve.



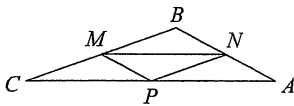
15



Midsegment

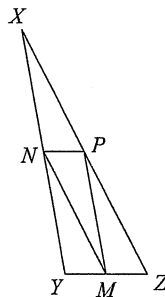
In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.

1)



\_\_\_\_\_  $\parallel$   $\overline{MP}$

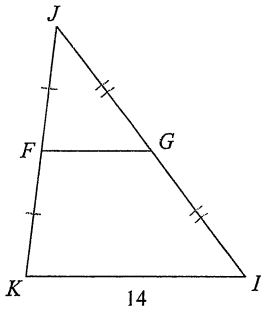
2)



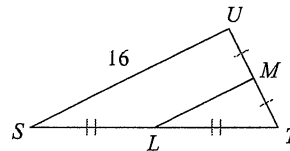
$\overline{YX} \parallel$  \_\_\_\_\_

Find the missing length indicated.

3) Find  $FG$

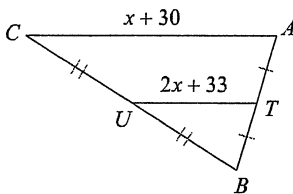


4) Find  $ML$

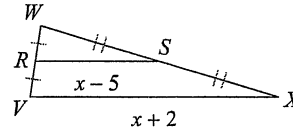


Solve for  $x$ .

5)

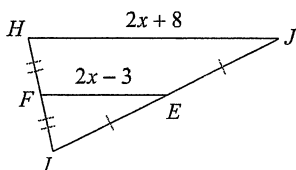


6)

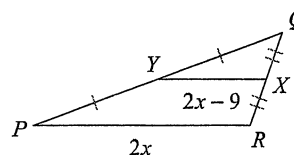


Find the missing length indicated.

7) Find  $JH$



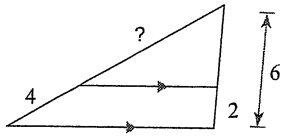
8) Find  $PR$



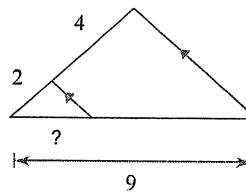
# Triangle Proportionality Theorem

Find the missing length indicated.

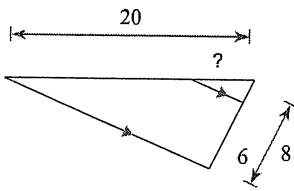
1)



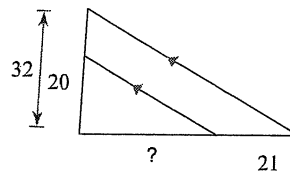
2)



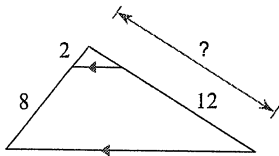
3)



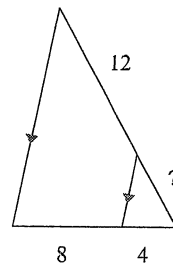
4)



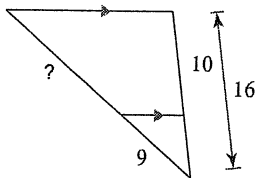
5)



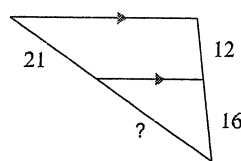
6)



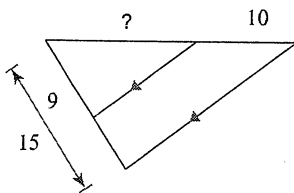
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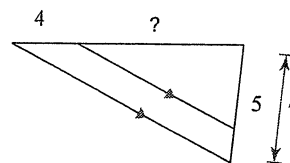
8)



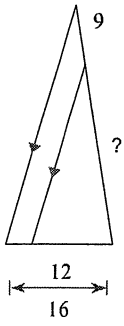
9)



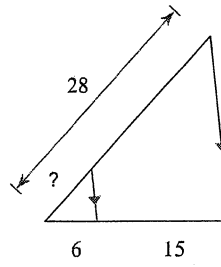
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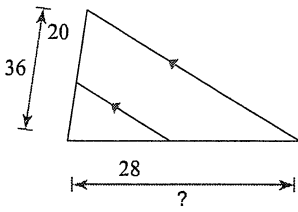
11)



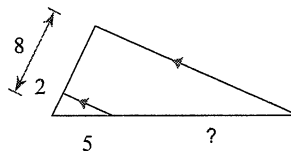
12)



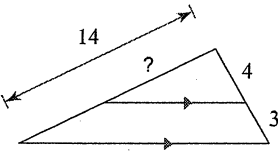
13)



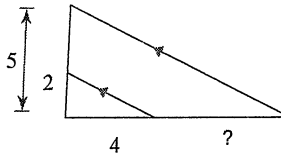
14)



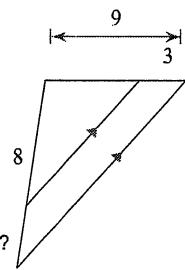
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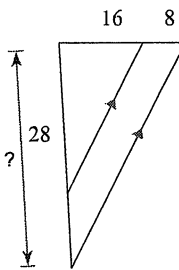
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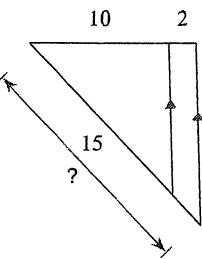
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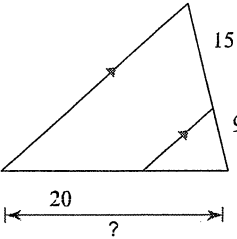
18)



19)



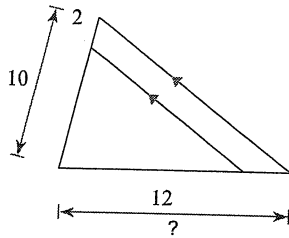
20)



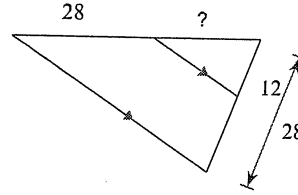
# Midsegment and Proportionality Review

Find the missing length indicated.

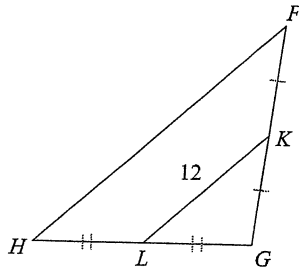
1)



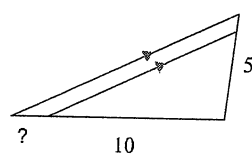
2)



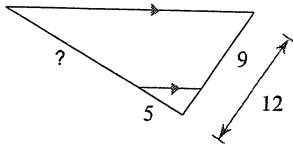
3) Find  $FH$



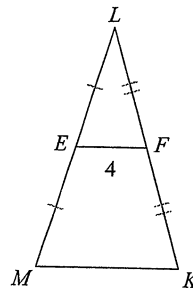
4)



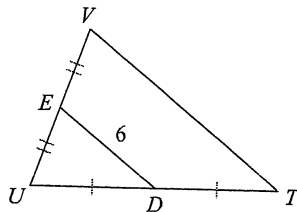
5)



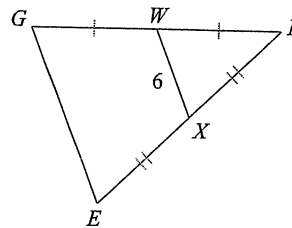
6) Find  $MK$



7) Find  $TV$

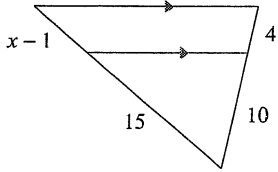


8) Find  $GE$

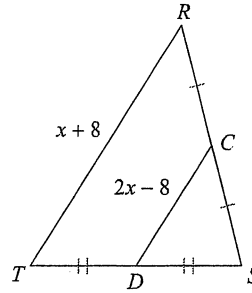


Solve for  $x$ .

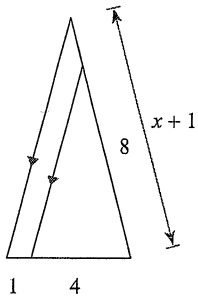
9)



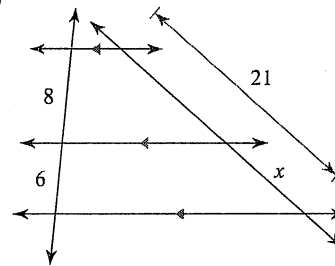
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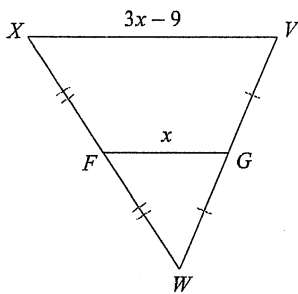
11)



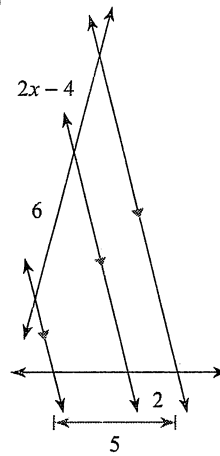
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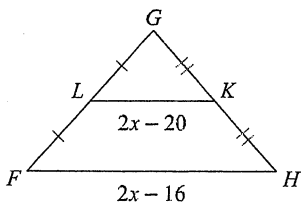
13)



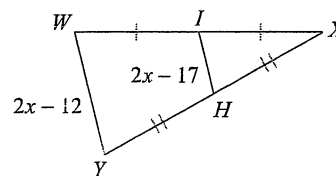
14)



15)

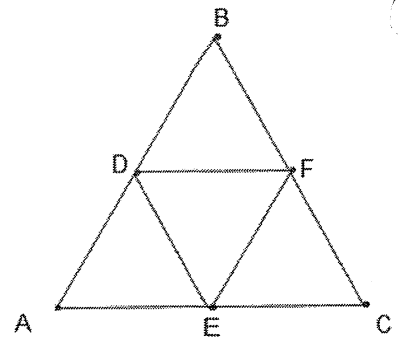


16)



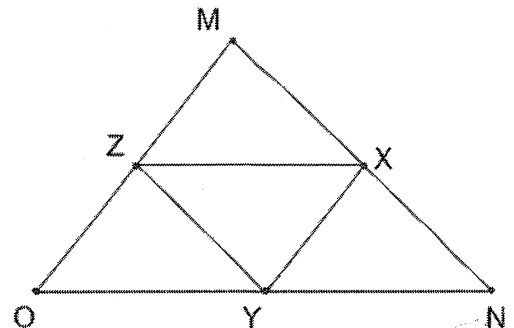
Use the diagram of  $\triangle ABC$  where D, E, and F are the midpoints of the sides.

1.  $\overline{DE} \parallel$  \_\_\_\_\_
2.  $\overline{FE} \parallel$  \_\_\_\_\_
3. If  $AB = 14$ , then  $EF =$  \_\_\_\_\_
4. If  $AE = 8$ , then  $DF =$  \_\_\_\_\_
5. If  $DE = 4x+5$   $BC = 12x-2$ , find  $x =$  \_\_\_\_\_,  $BC =$  \_\_\_\_\_



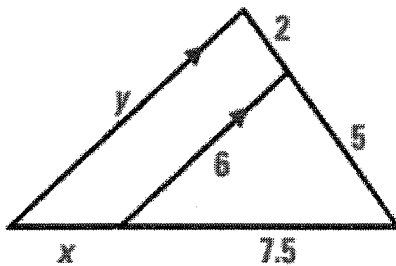
Use the diagram of  $\triangle MNO$  where X, Y, and Z are midpoints of the sides.

6. If  $YZ = 3x + 1$ , and  $MN = 10x - 6$  then  $YZ =$  \_\_\_\_\_
11. If  $YX = x - 1$ , and  $MO = 3x - 7$ , then  $MO =$  \_\_\_\_\_
12. If  $m\angle MON = 48^\circ$ , then  $m\angle MZX =$  \_\_\_\_\_
13. If  $m\angle MXZ = 37^\circ$ , then  $m\angle MNO =$  \_\_\_\_\_



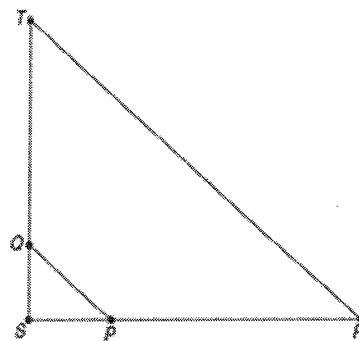
14. Solve for the following.

$x =$  \_\_\_\_\_  
 $y =$  \_\_\_\_\_

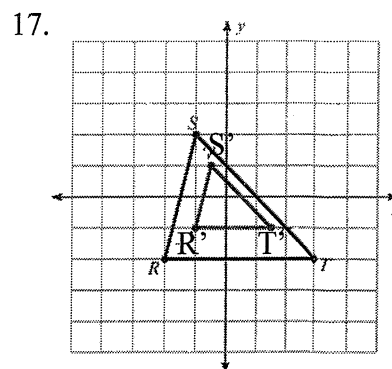
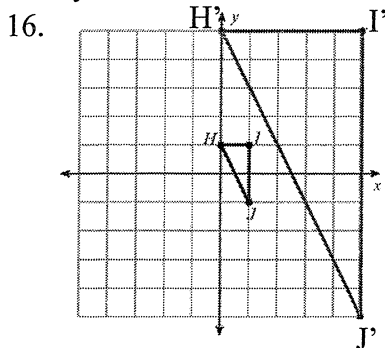


15.  $SQ = 10$  ;  $ST = 22$  ;  $SP = 12$  ;  $PR = 4x + 8$

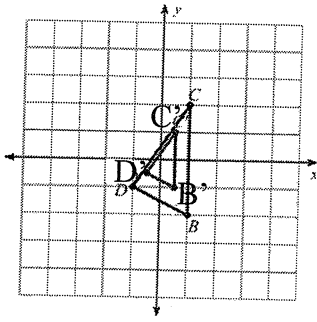
$x =$  \_\_\_\_\_,  $PR =$  \_\_\_\_\_



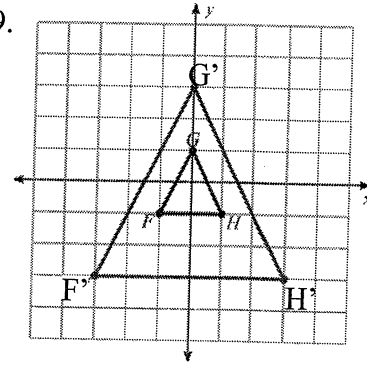
Identify the scale factor and tell if it is an enlargement or reduction.



18.



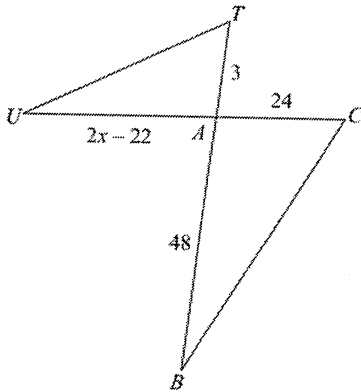
19.



20. Identify the scale factor from ABC to AUT.

Solve for x.

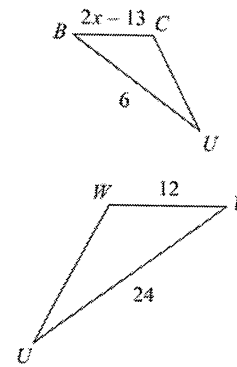
$$\triangle ABC \sim \triangle AUT$$



21. Identify scale factor UVW to UBC.

Solve for x.

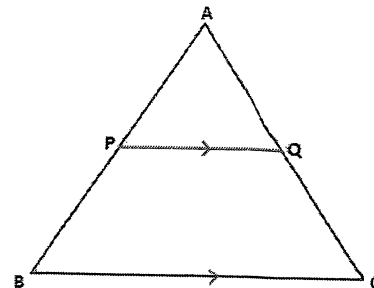
$$\triangle UVW \sim \triangle UBC$$



22. At a certain time of day a tree casts a shadow that is 24.5 ft long. At the same time a nearby 4 foot tall bush casts a 5.6 foot shadow. How tall is the tree?

23. The tallest roller coaster in the world is 138 meters tall. At 1 PM it casts a shadow. At the same time a park attendee waiting in line is 2 meters tall and their shadow is 1.2 meters long. How long is the shadow of the roller coaster?

24. AP = 6, PB = 8, PQ = 9, BC = x. What is the value of x?



1.  $\triangle A'B'C'$  is a dilation of triangle  $\triangle ABC$  by a scale factor of  $\frac{1}{2}$ . The dilation is centered at the point  $(5, 5)$ . Which statement below is true?

A.  $\frac{A'B'}{AB} = \frac{B'C'}{BC}$                       C.  $\frac{A'B'}{AB} = \frac{A'C'}{AC}$

B.  $\frac{A'B'}{AB} = \frac{AC}{A'C'}$                       D.  $\frac{A'B'}{AB} = \frac{A'C'}{AC}$

2.  $\triangle A'B'C'$  is a dilation of triangle  $\triangle ABC$  by a scale factor of  $\frac{1}{2}$ . The dilation is centered at the point  $(5, 5)$ . What is the ratio of the area of  $\triangle A'B'C'$  to the area of  $\triangle ABC$ ?

A.  $\frac{1}{2}$                                       C.  $\frac{1}{4}$

B.  $\frac{1}{4}$                                       D.  $\frac{1}{8}$

1

1.  $\triangle UVW \sim \triangle XYZ$

2. What is the scale factor of  $\triangle UVW$  to  $\triangle XYZ$ ?  $\frac{5}{6}$

3. What is  $VW$ ?  $10$

4. What is  $XZ$ ?  $9$

5. If  $m\angle U = 50^\circ$  and  $m\angle Y = 30^\circ$ , what is  $m\angle Z$ ?

**100**

2

# Proving Triangles Similar

3

### Angle-Angle (AA-) Similarity Postulate

If two angles of one triangle are \_\_\_\_\_ to two angles of another triangle, then the two triangles are similar.

4

### Side-Side-Side (SSS-) Similarity THM

If the \_\_\_\_\_ sides of two triangles are \_\_\_\_\_, then the triangles are similar.

5

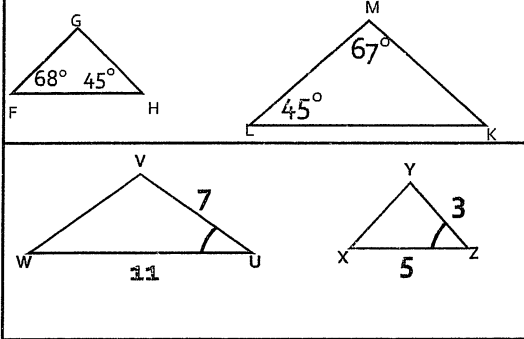
### Side-Angle-Side (SAS-) Similarity THM

If the lengths of two sides are \_\_\_\_\_ and the \_\_\_\_\_ angle is \_\_\_\_\_, then the triangles are similar.

6

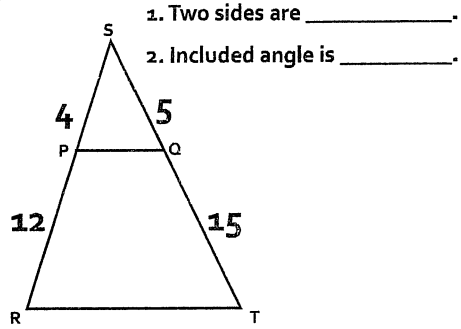


Ex. Determine whether the triangles are similar. If so, tell which similarity test is used and complete the statement.



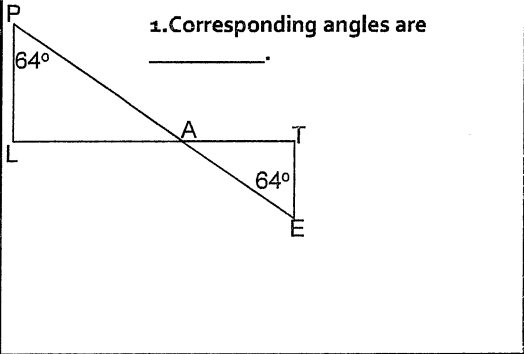
7

**Prove that  $RST \sim PSQ$**



8

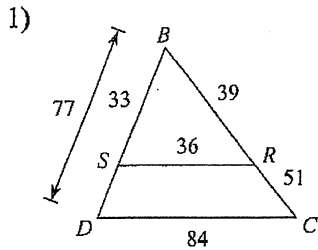
**Prove that  $\triangle PLA \sim \triangle EAT$**



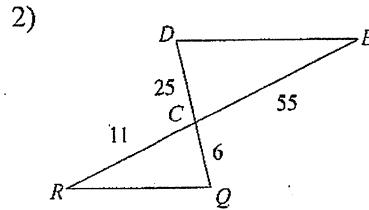
9

Proving Triangles Similar

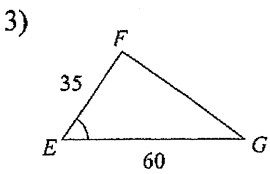
Decide if the triangles in each pair are similar. If so, state how you know they are similar by SSS~, SAS~, or AA~. Show all work.



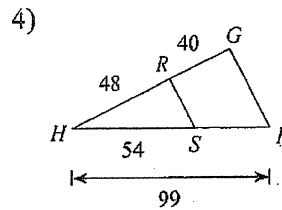
$\triangle ABC \sim$  \_\_\_\_\_



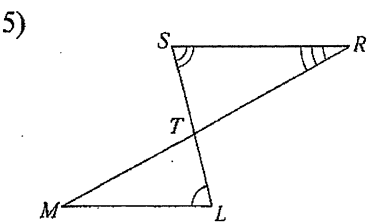
$\triangle CDE \sim$  \_\_\_\_\_



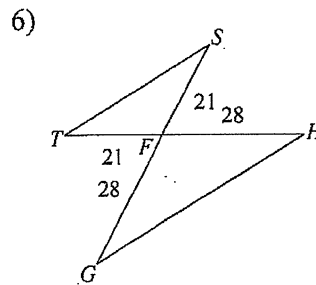
$\triangle EFG \sim$  \_\_\_\_\_



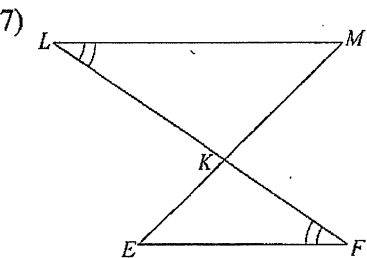
$\triangle HGF \sim$  \_\_\_\_\_



$\triangle TSR \sim$  \_\_\_\_\_

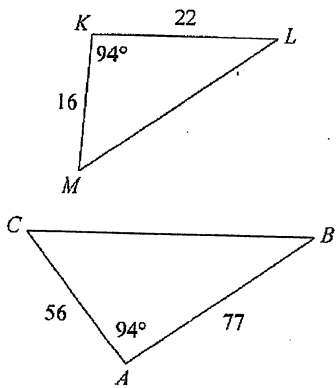


$\triangle FGH \sim$  \_\_\_\_\_



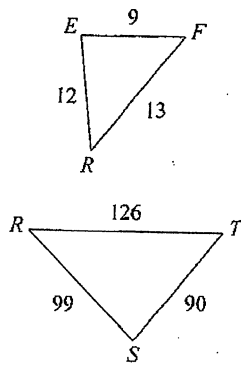
$\triangle KLM \sim$  \_\_\_\_\_

8)



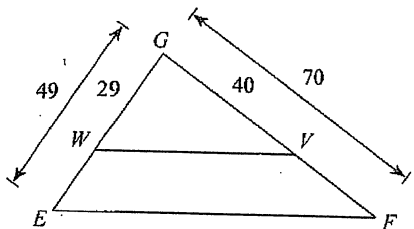
$\triangle ABC \sim$  \_\_\_\_\_

9)



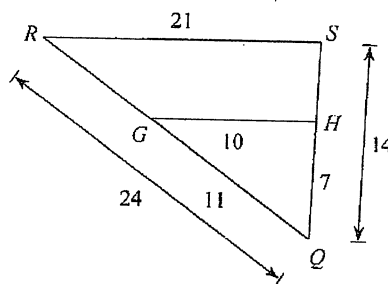
$\triangle RST \sim$  \_\_\_\_\_

10)



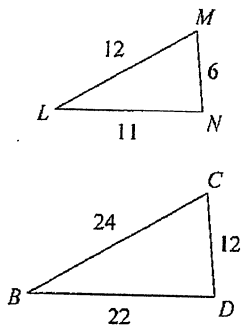
$\triangle GFE \sim$  \_\_\_\_\_

11)



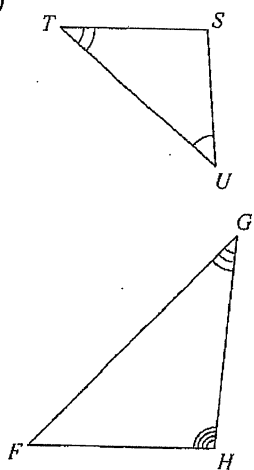
$\triangle QRS \sim$  \_\_\_\_\_

12)



$\triangle BCD \sim$  \_\_\_\_\_

13)

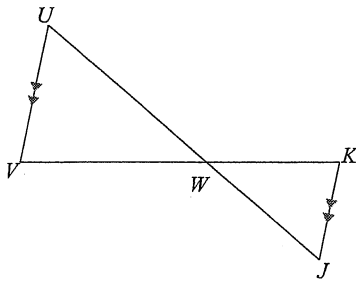


$\triangle FGH \sim$  \_\_\_\_\_

Proving Triangles Similar

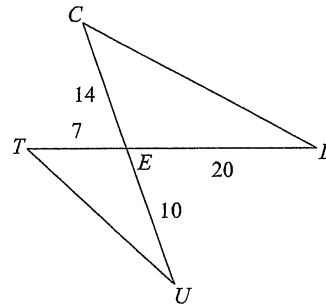
State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

1)



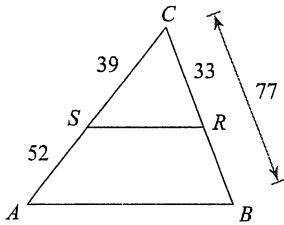
$\triangle WVU \sim$  \_\_\_\_\_

2)



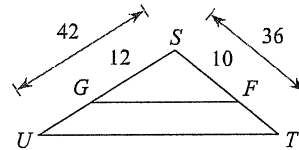
$\triangle EDC \sim$  \_\_\_\_\_

3)



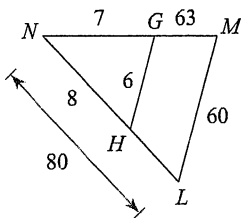
$\triangle CBA \sim$  \_\_\_\_\_

4)



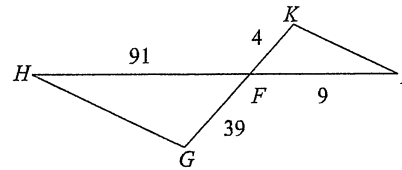
$\triangle STU \sim$  \_\_\_\_\_

5)



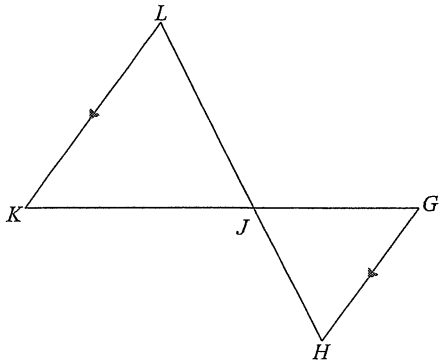
$\triangle NML \sim$  \_\_\_\_\_

6)



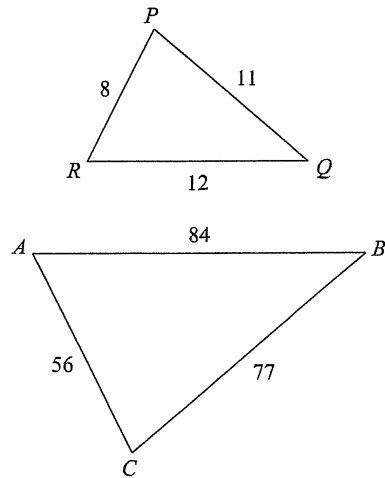
$\triangle FGH \sim$  \_\_\_\_\_

7)



$\triangle JKL \sim$  \_\_\_\_\_

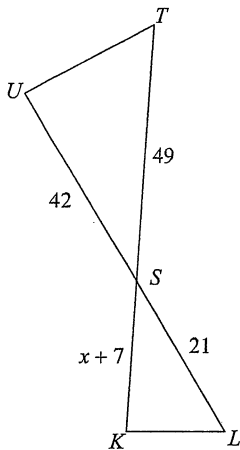
8)



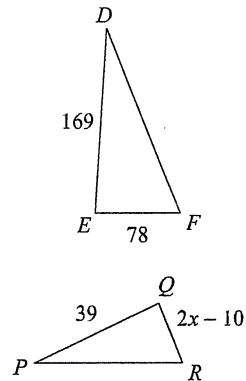
$\triangle CBA \sim$  \_\_\_\_\_

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

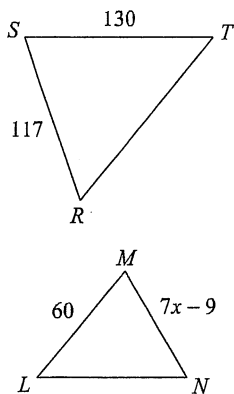
9)



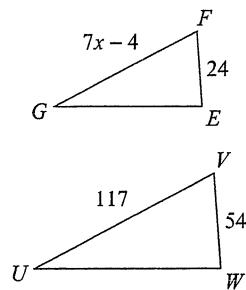
10)



11)

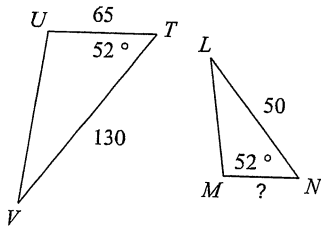


12)

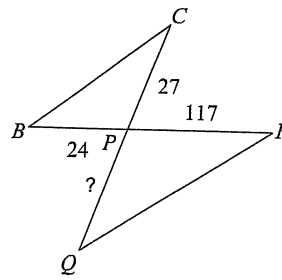


Find the missing length. The triangles in each pair are similar.

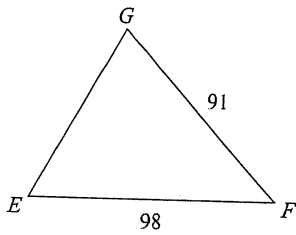
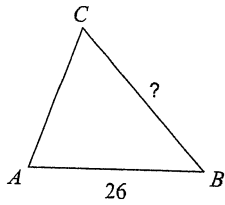
13)



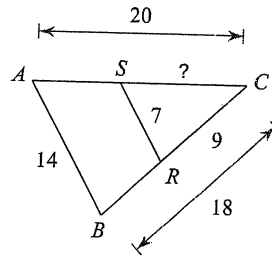
14)



15)



16)



6. In the triangle shown,  $\overline{AB} \parallel \overline{DE}$ . What is the length of  $\overline{CD}$ ?

A. 1.2                      C. 6.0  
 B. 3.3                      D. 7.5

1

$\sin(\theta) = \underline{\hspace{2cm}}$

$\cos(\theta) = \underline{\hspace{2cm}}$

$\tan(\theta) = \underline{\hspace{2cm}}$

2

Find the sine, the cosine, and the tangent of theta.

3

Find the sine, the cosine, and the tangent of theta.  
 Give a fraction.

Find the sine and cosine of  $90-\theta$

4

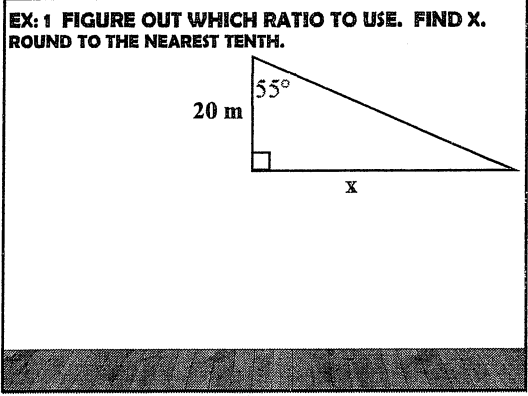
Find the sine, the cosine, and the tangent of theta.

Find the sine and cosine of  $90-\theta$

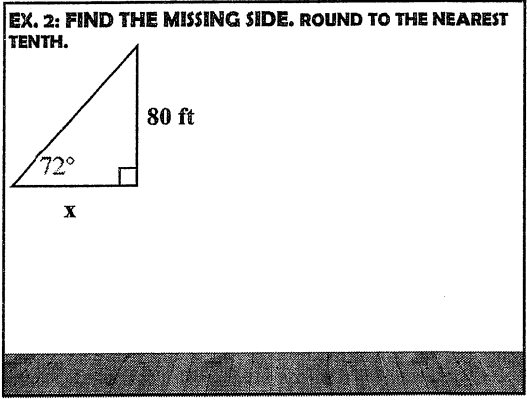
5

**FINDING A SIDE.**  
**(FIGURING OUT WHICH RATIO TO USE AND GETTING TO USE A TRIG BUTTON.)**

6

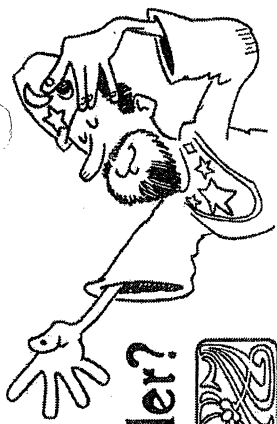


7



8

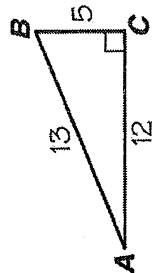




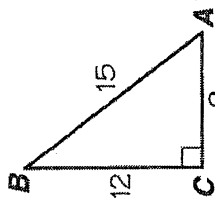
# What Did One Mind Reader Say to the Other Mind Reader?

Write the trigonometric ratio. Then write the letter of the correct choice in the box containing the exercise number. If the answer has a  shade in the box instead of writing a letter in it.

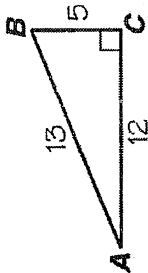
- 1  sin A      $\frac{12}{13}$       $\frac{5}{13}$   
 2  cos A      $\frac{5}{12}$       $\frac{13}{5}$   
 3  tan A      $\frac{13}{12}$       $\frac{13}{5}$



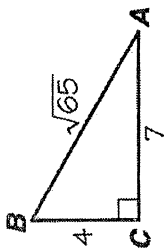
- 13  sin A      $\frac{3}{5}$       $\frac{5}{3}$   
 14  cos A      $\frac{4}{3}$       $\frac{4}{5}$   
 15  tan A      $\frac{4}{3}$       $\frac{4}{5}$



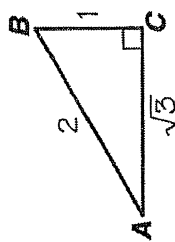
- 4  sin B      $\frac{13}{5}$       $\frac{5}{13}$   
 5  cos B      $\frac{12}{13}$       $\frac{12}{5}$   
 6  tan B      $\frac{12}{13}$       $\frac{12}{5}$



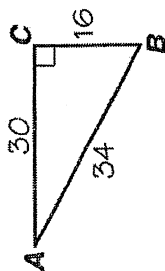
- 16  sin B      $\frac{4}{7}$       $\frac{4}{\sqrt{65}}$   
 17  cos B      $\frac{7}{4}$       $\frac{7}{\sqrt{65}}$   
 18  tan B      $\frac{7}{4}$       $\frac{7}{\sqrt{65}}$



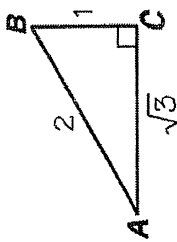
- 7  sin A      $\frac{\sqrt{3}}{2}$       $\frac{1}{2}$   
 8  cos A      $\frac{1}{\sqrt{3}}$      2  
 9  tan A      $\frac{1}{\sqrt{3}}$      2



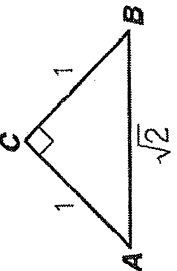
- 19  sin A      $\frac{15}{17}$       $\frac{8}{17}$   
 20  cos A      $\frac{17}{8}$       $\frac{8}{15}$   
 21  tan A      $\frac{17}{8}$       $\frac{8}{15}$



- 10  sin B      $\sqrt{3}$       $\frac{1}{2}$   
 11  cos B      $\frac{\sqrt{3}}{2}$       $\frac{1}{\sqrt{3}}$   
 12  tan B      $\frac{\sqrt{3}}{2}$       $\frac{1}{\sqrt{3}}$



- 22  sin A      $\frac{1}{\sqrt{2}}$       $\frac{1}{\sqrt{2}}$   
 23  cos A      $\sqrt{2}$      1  
 24  tan A      $\sqrt{2}$      1



8	12	19	2	15	5	22	13	17	6	3	16	9	24	1	11	20	23	4	7	10	18	21	14
---	----	----	---	----	---	----	----	----	---	---	----	---	----	---	----	----	----	---	---	----	----	----	----

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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**Trigonometry Ratios – Classwork**

---

**Draw  $\triangle ABC$  where  $\angle ABC = 90^\circ$ ,  $AB = 8$ ,  $BC = 15$ , and  $AC = 17$ .**

1. What is  $\tan C$ ?
2. What is  $\sin A$ ?

---

**Draw  $\triangle ABC$  where  $\angle ACB = 90^\circ$ ,  $AC = 5$ , and  $CB = 12$ .**

3. What is the length of  $AB$ ?
4. What is  $\cos A$ ?
5. What is  $\tan B$ ?

---

**Draw  $\triangle CAT$  where  $\angle ATC = 90^\circ$ ,  $CA = 53$ , and  $CT = 28$ .**

6. What is the length of  $AT$ ?
7. What is  $\sin C$ ?
8. What is  $\tan A$ ?

---

**Draw  $\triangle ABC$  where  $\angle B = 90^\circ$  and  $\sin A = \frac{12}{20}$ .**

9. What is the length of  $AB$ ?
10. What is  $\tan A$ ?
11. What is  $\cos A$ ?

---

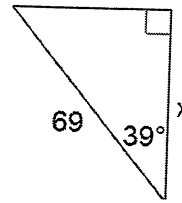
**Draw  $\triangle HAT$  where  $\angle H = 90^\circ$  and  $\tan T = \frac{12}{35}$ .**

12. What is the length of  $AT$ ?
  13. What is  $\sin A$ ?
  14. What is  $\cos T$ ?
-

In the following problems, **DRAW** stick-man standing where the angle is and **MARK** each given side as **A** (adjacent), **O** (opposite), or **H** (hypotenuse). Then **TELL** which **TRIG RATIO** you have. You will NOT be solving the problem for  $x$  (we haven't learned how YET).

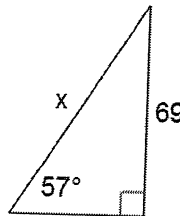
15. Which trig ratio is represented?

- A. SIN
- B. COS
- C. TAN



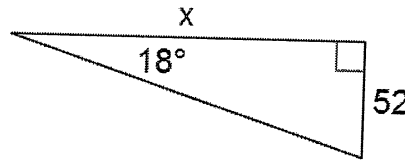
16. Which trig ratio is represented?

- A. SIN
- B. COS
- C. TAN



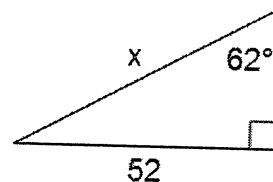
17. Which trig ratio is represented?

- A. SIN
- B. COS
- C. TAN



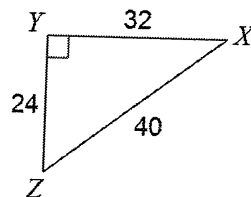
18. Which trig ratio is represented?

- A. SIN
- B. COS
- C. TAN

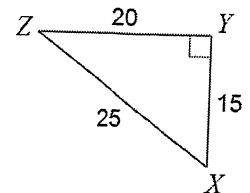


Find each ratio and be sure to reduce, if possible.

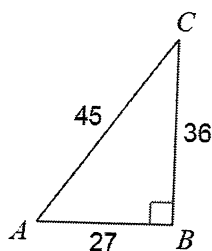
19.  $\tan Z$



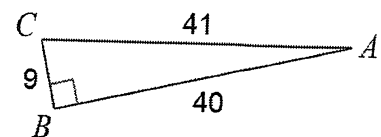
20.  $\sin X$



21.  $\cos A$



22.  $\sin C$



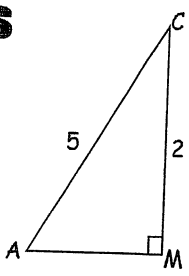
Circle P is dilated to form circle P'. Which statement is ALWAYS true?

- The radius of the circle P is equal to the radius of circle P'
- The length of any chord in circle P is greater than the length of any chord in circle P'
- Diameter of circle P is greater than the diameter of circle P'
- The ratio of the diameter to the circumference is the same for both circles.

1

### Trig Ratios

- $\sin A =$
- $\cos A =$
- $\tan A =$
- If  $C = 20^\circ$ , then  $\cos C$  is equal to:
  - $\sin 70$
  - $\cos 70$
  - $\tan 70$



2

## Using Trig to Find Missing Angles and Missing Sides

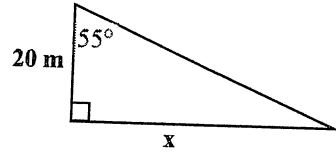
3

### Finding a side.

*(Figuring out which ratio to use and getting to use a trig button.)*

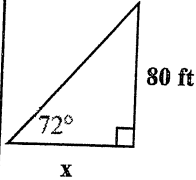
4

**Ex. 1** Figure out which ratio to use. Find  $x$ . Round to the nearest tenth.



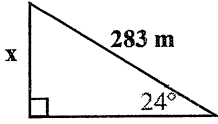
5

**Ex. 2** Find the missing side. Round to the nearest tenth.



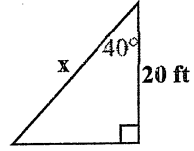
6

**Ex: 3 Find the missing side. Round to the nearest tenth.**



7

**Ex: 4 Find the missing side. Round to the nearest tenth.**

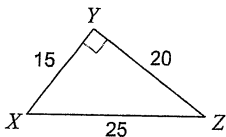


8

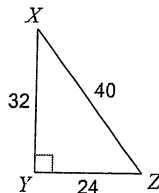
Right Triangle Trig

Find the value of each trigonometric ratio. Reduce the fraction.

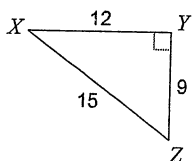
1)  $\tan X$



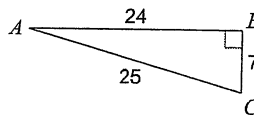
2)  $\sin Z$



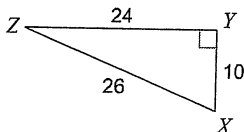
3)  $\cos Z$



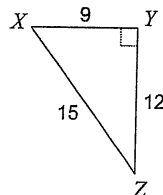
4)  $\cos A$



5)  $\sin Z$

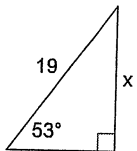


6)  $\tan X$

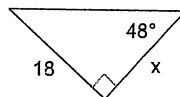


State which trig function you should use, set up the problem, and then find the missing side. Round to the nearest tenth.

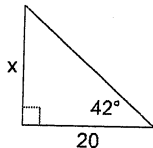
7)



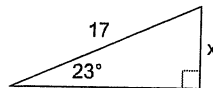
8)

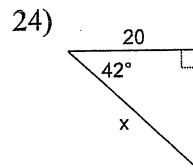
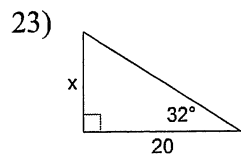
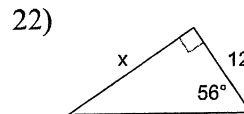
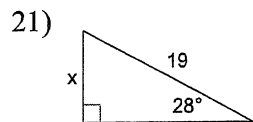
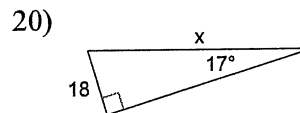
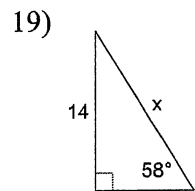
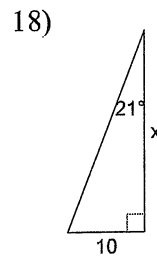
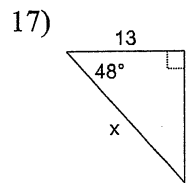
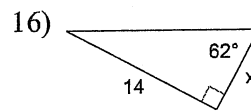
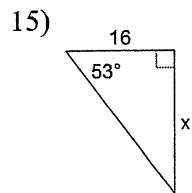
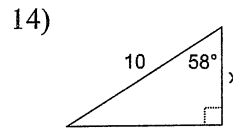
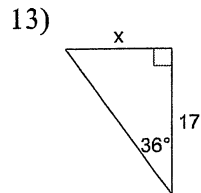
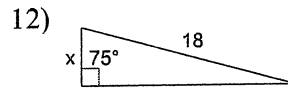
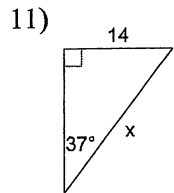


9)



10)

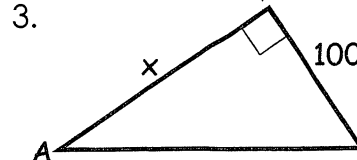
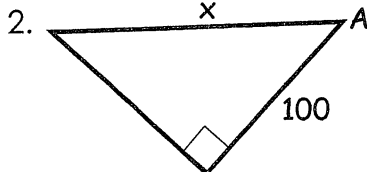
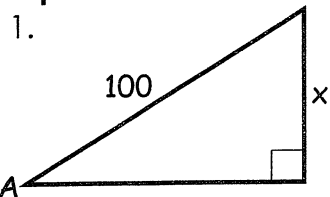




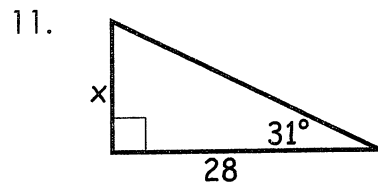
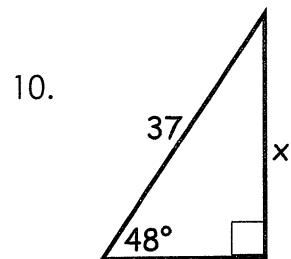
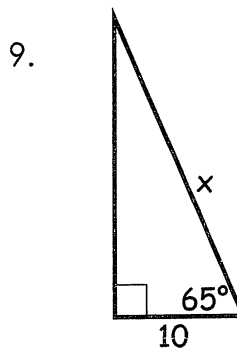
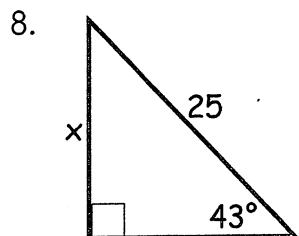
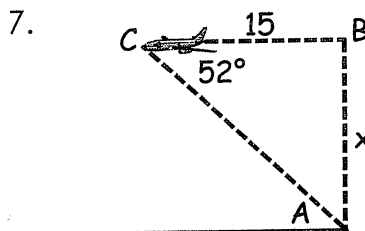
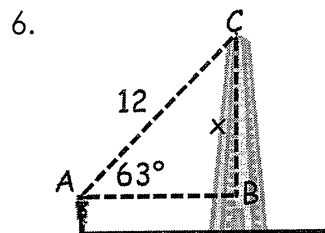
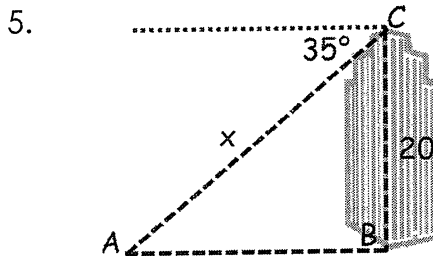
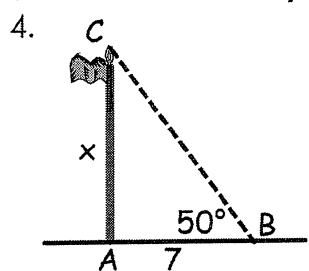
Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Find the Missing Side Practice**

Give the trigonometric ratio which relates 100 and  $x$  to  $\angle A$ . Write an equation to represent the relationship. Do not solve for  $A$ . Just set up the equation. (Ex.  $x = 10\sin 40^\circ$ )



Solve for  $x$ . Show your equation and circle your answer.





Using the figure at the right, determine which of the following statements is true?

- A.  $\cos A = \sin E$
- B.  $\cos A = \sin D$
- C.  $\cos E = \tan D$
- D.  $\tan A = \tan D$

1

$\sin(\theta) =$

$\cos(\theta) =$

$\tan(\theta) =$

2

**Finding a missing angle.**  
*(Figuring out which ratio to use and an inverse trig button.)*

3

**Ex: 1** Figure out which ratio to use. Find  $x$ . Round to the nearest tenth.

4

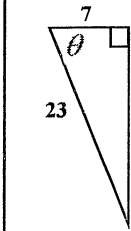
**Ex: 2** Figure out which ratio to use. Find  $x$ . Round to the nearest tenth.

5

**Ex: 3** Find  $\theta$ . Round to the nearest degree.

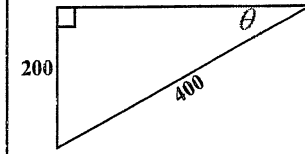
6

Ex. 4: Find  $\theta$ . Round to the nearest degree.



7

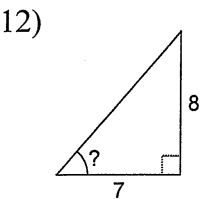
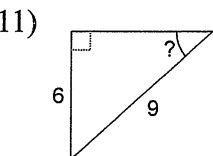
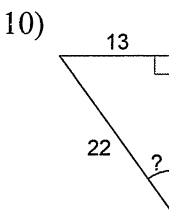
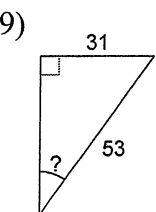
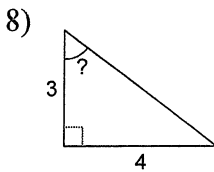
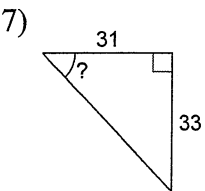
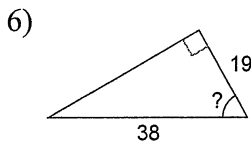
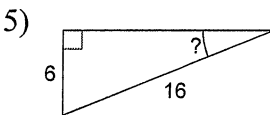
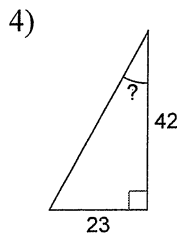
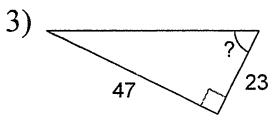
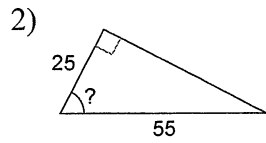
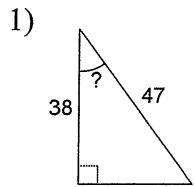
Ex. 5: Find  $\theta$ . Round to the nearest degree.



8

Trigonometry: Finding Angle Measures

Find the measure of the indicated angle to the nearest degree.



Use your calculator to find the value of the following round to the nearest tenth.

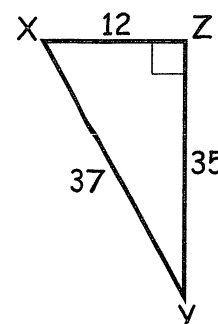
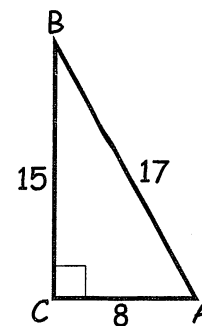
- |  |  |  |
|--|--|--|
| 1. $\sin 20^\circ = \underline{\hspace{1cm}}$  | 2. $\cos 80^\circ = \underline{\hspace{1cm}}$  | 3. $\tan 35^\circ = \underline{\hspace{1cm}}$  |
| 4. $\sin 51^\circ = \underline{\hspace{1cm}}$  | 5. $\cos 17^\circ = \underline{\hspace{1cm}}$  | 6. $\tan 39^\circ = \underline{\hspace{1cm}}$  |
| 7. $\sin 43^\circ = \underline{\hspace{1cm}}$  | 8. $\cos 26^\circ = \underline{\hspace{1cm}}$  | 9. $\tan 62^\circ = \underline{\hspace{1cm}}$  |
| 10. $\sin 18^\circ = \underline{\hspace{1cm}}$ | 11. $\cos 73^\circ = \underline{\hspace{1cm}}$ | 12. $\tan 84^\circ = \underline{\hspace{1cm}}$ |

Find the measure of angle A to the nearest degree.

- |  |  |
|--|--|
| 13. $\sin A = 0.4695$ $A = \underline{\hspace{1cm}}$ | 14. $\cos A = 0.9511$ $A = \underline{\hspace{1cm}}$ |
| 15. $\cos A = 0.3762$ $A = \underline{\hspace{1cm}}$ | 16. $\sin A = 0.9751$ $A = \underline{\hspace{1cm}}$ |
| 17. $\tan A = 0.4245$ $A = \underline{\hspace{1cm}}$ | 18. $\cos A = 0.8835$ $A = \underline{\hspace{1cm}}$ |
| 19. $\sin A = 0.6939$ $A = \underline{\hspace{1cm}}$ | 20. $\tan A = 4.0940$ $A = \underline{\hspace{1cm}}$ |
| 21. $\tan A = 0.3788$ $A = \underline{\hspace{1cm}}$ | 22. $\sin A = 0.8384$ $A = \underline{\hspace{1cm}}$ |
| 23. $\sin A = 0.0710$ $A = \underline{\hspace{1cm}}$ | 24. $\tan A = 1.2511$ $A = \underline{\hspace{1cm}}$ |

For each of the following find the trigonometric ratio, and the measure in degrees of the given angle.

- |              | RATIO                        | DEGREES                        |
|--------------|------------------------------|--------------------------------|
| 25. $\sin A$ | $= \underline{\hspace{1cm}}$ | $A = \underline{\hspace{1cm}}$ |
| 26. $\cos A$ | $= \underline{\hspace{1cm}}$ | $A = \underline{\hspace{1cm}}$ |
| 27. $\tan A$ | $= \underline{\hspace{1cm}}$ | $A = \underline{\hspace{1cm}}$ |
| 28. $\sin B$ | $= \underline{\hspace{1cm}}$ | $B = \underline{\hspace{1cm}}$ |
| 29. $\cos B$ | $= \underline{\hspace{1cm}}$ | $B = \underline{\hspace{1cm}}$ |
| 30. $\tan B$ | $= \underline{\hspace{1cm}}$ | $B = \underline{\hspace{1cm}}$ |
| 31. $\sin X$ | $= \underline{\hspace{1cm}}$ | $X = \underline{\hspace{1cm}}$ |
| 32. $\cos X$ | $= \underline{\hspace{1cm}}$ | $X = \underline{\hspace{1cm}}$ |
| 33. $\tan X$ | $= \underline{\hspace{1cm}}$ | $X = \underline{\hspace{1cm}}$ |
| 34. $\sin Y$ | $= \underline{\hspace{1cm}}$ | $Y = \underline{\hspace{1cm}}$ |
| 35. $\cos Y$ | $= \underline{\hspace{1cm}}$ | $Y = \underline{\hspace{1cm}}$ |
| 36. $\tan Y$ | $= \underline{\hspace{1cm}}$ | $Y = \underline{\hspace{1cm}}$ |



**Find these trigonometric values.**

1.  $\sin 65^\circ$  \_\_\_\_\_

2.  $\cos 18^\circ$  \_\_\_\_\_

3.  $\tan 35^\circ$  \_\_\_\_\_

4.  $\cos 72^\circ$  \_\_\_\_\_

5.  $\tan 10^\circ$  \_\_\_\_\_

6.  $\cos 40^\circ$  \_\_\_\_\_

**Find angle A.**

7.  $\cos A = 0.3420$  \_\_\_\_\_

8.  $\sin A = 0.5150$  \_\_\_\_\_

9.  $\tan A = 0.7536$  \_\_\_\_\_

10.  $\tan A = 11.4301$  \_\_\_\_\_

11.  $\cos A = 0.6428$  \_\_\_\_\_

12.  $\sin A = 0.9781$  \_\_\_\_\_

**Find angle A to the nearest degree.**

13.  $\tan A = 4.2274$  \_\_\_\_\_

14.  $\sin A = 0.5328$  \_\_\_\_\_

15.  $\cos A = 0.9740$  \_\_\_\_\_

16.  $\cos A = 0.5630$  \_\_\_\_\_

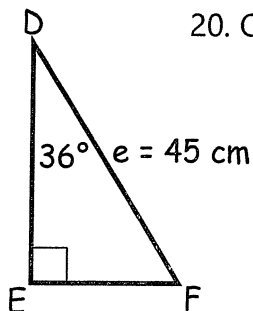
17.  $\tan A = 0.2947$  \_\_\_\_\_

18.  $\sin A = 0.7815$  \_\_\_\_\_

**Show the expression to solve for the variable (ex.  $x = 15/\sin 43^\circ$ ). Then, solve the triangle problems. Round to the nearest tenth.**

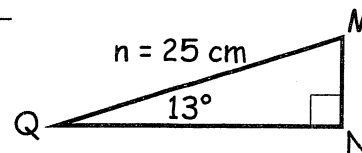
19.  $D = 36^\circ$  and  $e = 45$  cm.

Find  $f$ . \_\_\_\_\_



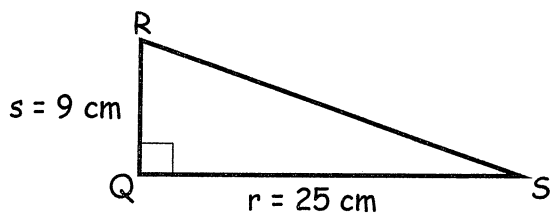
20.  $Q = 13^\circ$  and  $n = 25$  cm.

Find  $q$ . \_\_\_\_\_



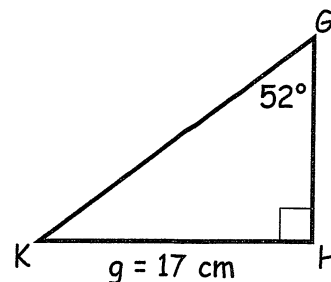
21.  $s = 9$  cm and  $r = 25$  cm.

Find  $S$ . \_\_\_\_\_



22.  $G = 52^\circ$  and  $g = 17$  cm.

Find  $h$ . \_\_\_\_\_



**Solve:**

23. A wire runs from a point on the ground to the top of a 24-ft flagpole. The angle of elevation of the wire is  $60^\circ$ . How long is the wire?  
\_\_\_\_\_

24. A 30-ft ladder is placed against a wall so that its angle of elevation is  $45^\circ$ . How far from the ground is the top of the ladder?  
\_\_\_\_\_

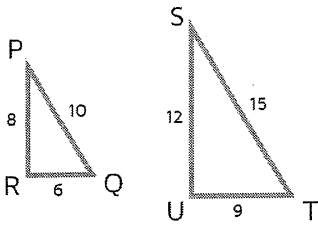
25. A kite is flown with 240 yards of string. The angle of elevation of the string is  $55^\circ$ . How high above the ground is the kite?  
\_\_\_\_\_

1. A segment that is 50 feet long is dilated to length of 30 feet. What is the scale factor?

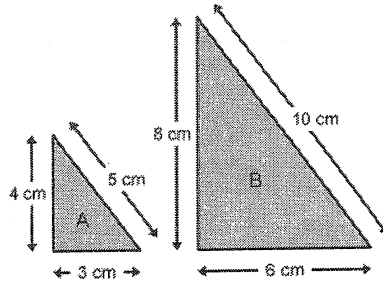
2. If figure was dilated by a scale factor of 4, explain how the size of the figure would change?

3. Identify the scale factor in each the following images.

a. STU to PQR

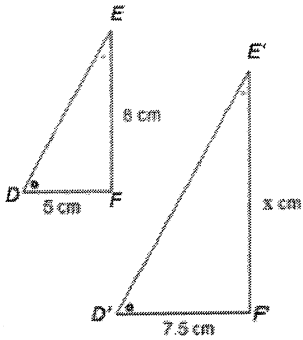


b. A to B

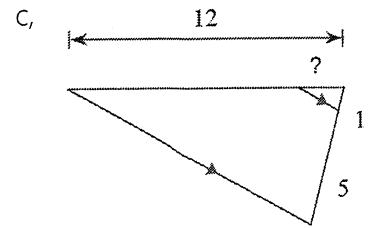
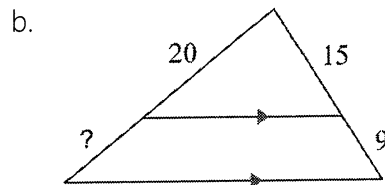
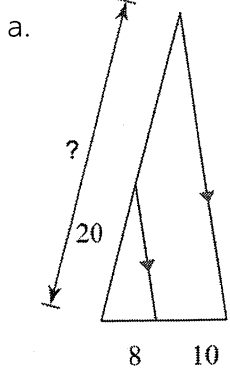


4. If triangle HIJ has side lengths of 34, 6.5, and 28.5, would the triangle QRS with side lengths 13, 68, and 56, be similar to HIJ? Explain why or why not.

5. If segment DE is 9, what is the perimeter of triangle D'E'F'?



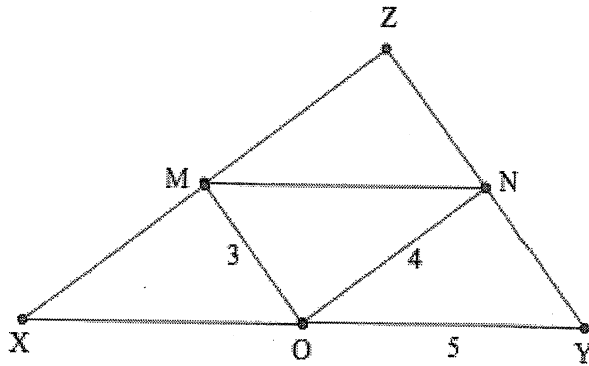
6. Find the value of '?' in each of the following.



7. Points M, N, and O are midpoints.

a. What is the perimeter of triangle XYZ?

b. What is the perimeter of triangle MNO?



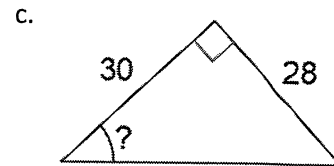
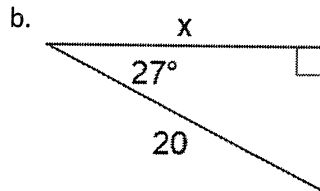
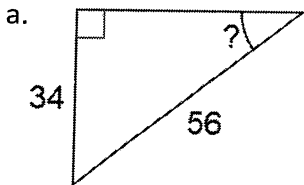
8. Answer the following questions.

a. Identify a trigonometric function that would have the same value as  $\cos(32)$ .

b. In triangle ABC, angle C is 90 degrees. If  $\cos(A) = 8/10$ , what is  $\sin(B)$ ? Leave answer as a simplified fraction.

c. The  $\cos(\theta) = 8/12$ , what is the  $\sin(90 - \theta)$ ?

9. Find the measure of the indicated piece for each right triangle. Round to the nearest hundredth.



10. The angle of depression from the top of a tower to a boulder on the ground is  $65^\circ$ . If the tower is 15 meters high, how far from the base of the tower is the boulder? Round to the nearest whole number.

11. A 75 foot building casts an 82 foot shadow. What is the angle that the sun hits the building? Round to the nearest degree.

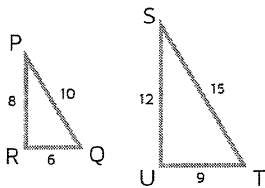
12. A block slides down a  $45^\circ$  slope for a total of 2.8 meters. What is the change in the height of the block? Round to the nearest tenth.

1. A segment that is 50 feet long is dilated to length of 110 feet. What is the scale factor?

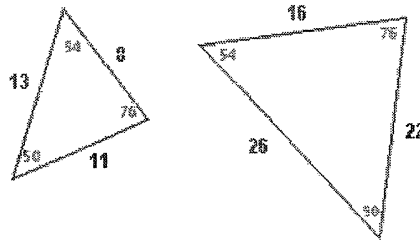
2. If figure was dilated by a scale factor of 3, explain how the size of the figure would change?

3. Identify the scale factor in each the following images.

a. PQR to STU

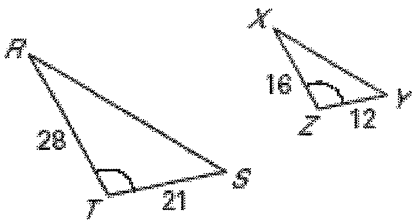


b. Big to Small

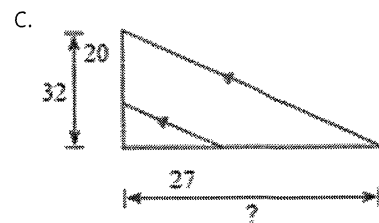
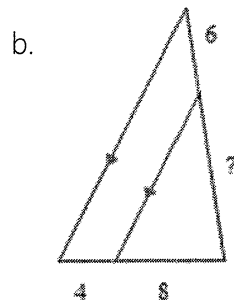
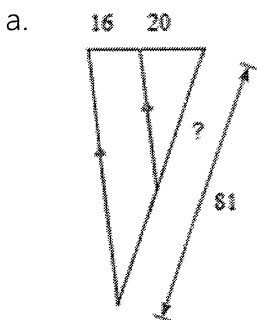


4. If triangle HIJ has side lengths of 12, 6, and 14, would the triangle QRS with side lengths 18, 21, and 9, be similar to HIJ? Explain why or why not.

5. If segment RS is 35, what is the perimeter of triangle XYZ?

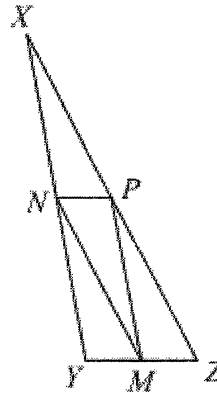


6. Find the value of '?' in each of the following.





7. Points P, N, and M are midpoints. NP=4, PZ=6, and PM=5



a. What is the perimeter of triangle XYZ?

b. What is the perimeter of triangle MNP?

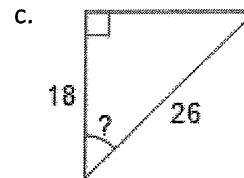
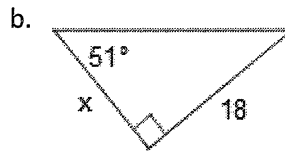
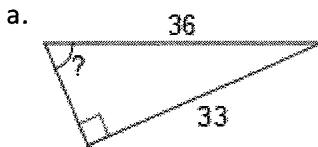
8. Answer the following questions.

a. Identify a trigonometric function that would have the same value as  $\sin(47^\circ)$ .

b. In triangle ABC, angle C is 90 degrees. If  $\cos(B) = 24/25$ , what is  $\sin(B)$ ? Leave answer as a simplified fraction.

c. The  $\cos(\theta) = 25/65$ , what is the  $\sin(90^\circ - \theta)$ ?

9. Find the measure of the indicated piece for each right triangle. Round to the nearest hundredth.



10. The angle of depression from the top of a tower to a boulder on the ground is  $49^\circ$ . If the tower is 25 meters high, how far from the base of the tower is the boulder? Round to the nearest whole number.

11. A 45 foot building has a zipline to the ground. If the zipline is 97 feet long, what is the angle that zipline makes with the ground? Round to the nearest degree.

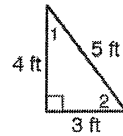
12. A handicap ramp is 12 feet long. The angle the ramp makes with the ground is 8 degrees. What is the height of the ramp? Round the nearest tenth of a foot.

# Geometry

# Trig Ratio HW

## Solving Right Triangles

Use the given trigonometric ratio to determine whether  $\angle 1$  or  $\angle 2$  is  $\angle A$  in each exercise.



1.  $\sin A = \frac{4}{5}$  \_\_\_\_\_

2.  $\cos A = \frac{4}{5}$  \_\_\_\_\_

3.  $\tan A = \frac{3}{4}$  \_\_\_\_\_

4.  $\sin A = \frac{3}{5}$  \_\_\_\_\_

5.  $\cos A = \frac{3}{5}$  \_\_\_\_\_

6.  $\tan A = \frac{4}{3}$  \_\_\_\_\_

Use a calculator to find each angle measure to the nearest degree.

7.  $\sin^{-1}(0.33)$  \_\_\_\_\_

8.  $\cos^{-1}(0.47)$  \_\_\_\_\_

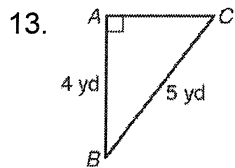
9.  $\tan^{-1}(1.21)$  \_\_\_\_\_

10.  $\sin^{-1}\left(\frac{9}{10}\right)$  \_\_\_\_\_

11.  $\cos^{-1}\left(\frac{1}{5}\right)$  \_\_\_\_\_

12.  $\tan^{-1}\left(2\frac{3}{4}\right)$  \_\_\_\_\_

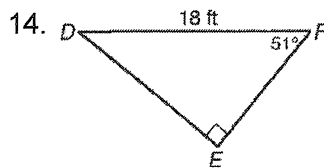
Use a calculator and inverse trigonometric ratios to find the unknown side lengths and angle measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.



AC = \_\_\_\_\_

$m\angle B =$  \_\_\_\_\_

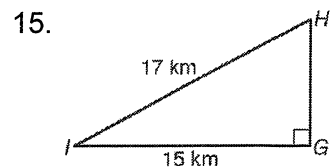
$m\angle C =$  \_\_\_\_\_



DE = \_\_\_\_\_

EF = \_\_\_\_\_

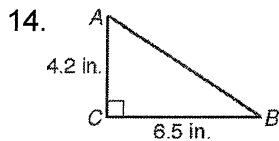
$m\angle D =$  \_\_\_\_\_



GH = \_\_\_\_\_

$m\angle H =$  \_\_\_\_\_

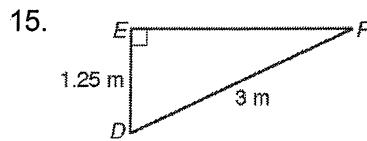
$m\angle I =$  \_\_\_\_\_



AB = \_\_\_\_\_

$m\angle A =$  \_\_\_\_\_

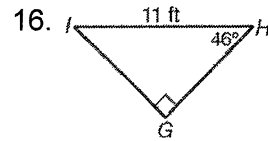
$m\angle B =$  \_\_\_\_\_



EF = \_\_\_\_\_

$m\angle D =$  \_\_\_\_\_

$m\angle F =$  \_\_\_\_\_



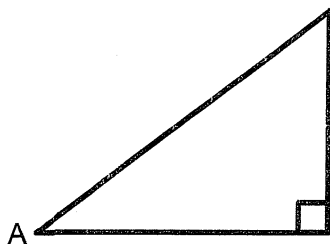
GH = \_\_\_\_\_

GI = \_\_\_\_\_

$m\angle I =$  \_\_\_\_\_

If  $\sin A = \frac{4}{5}$ , find  $\cos A$  and  $\tan A$ . Leave the answers in ratio form.

Then use a calculator to find  $m\angle A$  to the nearest tenth of a degree.



17.  $\cos A =$  \_\_\_\_\_ 18.  $\tan A =$  \_\_\_\_\_ 19.  $m\angle A =$  \_\_\_\_\_

Given the value of one trigonometric function, find the other two. Leave the answers in ratio form. Rationalize fractions. Find angle measures to the nearest tenth of a degree.

20.  $\tan E = \frac{1}{2}$        $\angle E =$  \_\_\_\_\_

21.  $\cos M = \frac{\sqrt{3}}{2}$        $\angle M =$  \_\_\_\_\_

22.  $\sin H = \frac{\sqrt{2}}{2}$        $\angle H =$  \_\_\_\_\_

23.  $\tan K = \sqrt{3}$        $\angle K =$  \_\_\_\_\_

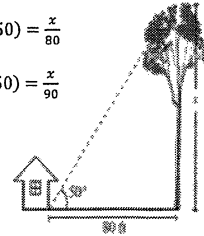
In right  $\triangle HJK$ ,  $\angle J$  is a right angle and  $\tan(H) = 1$ . Which statement about  $\triangle HJK$  must be true?

- A.  $\sin(H) = \frac{1}{2}$                       B.  $\sin(H) = 1$   
 C.  $\sin(H) = \cos(H)$               D.  $\sin(H) = \frac{1}{\cos(H)}$

1

There is a large tree 80 feet from a house. The owners are worried that the tree might fall on their house and want to estimate the height of the tree. In the figure below, when the sun's angle of elevation is  $50^\circ$ , the tree casts a shadow 80 feet long. Which can be used to find the height of the tree?

- A.  $\sin(50) = \frac{80}{x}$                       B.  $\tan(50) = \frac{x}{80}$   
 C.  $\cos(50) = \frac{80}{x}$                       D.  $\sin(50) = \frac{x}{90}$



2

## Solving Word Problems

Use the 3 ratios – sin, cos and tan to solve application problems.

Choose the easiest ratio(s) to use based on what information you are given in the problem.

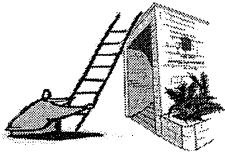
3

1. From a point 80m from the base of a tower, the angle of elevation is  $28^\circ$ . How tall is the tower?



4

2. A ladder that is 20 ft is leaning against the side of a building. If the angle formed between the ladder and ground is  $75^\circ$ , how far will Ms. McGinnis have to crawl to get to the front door when she falls off the ladder (assuming she falls to the base of the ladder)?



5

3. When the sun is  $62^\circ$  above the horizon, a building casts a shadow 18m long. How tall is the building?



6

4. A kite is flying at an angle of elevation of about  $55^\circ$ . Ignoring the sag in the string, find the height of the kite if 85m of string have been let out. a



7

5. A 5.50 foot person standing 10 feet from a street light casts a 24 foot shadow. What is the height of the streetlight?

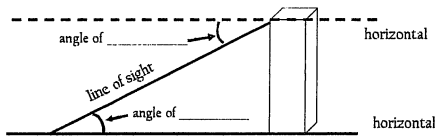


8

### Depression and Elevation

If a person on the ground looks up to the top of a building, the angle formed between the line of sight and the horizontal is called the \_\_\_\_\_.

If a person standing on the top of a building looks down at a car on the ground, the angle formed between the line of sight and the horizontal is called the \_\_\_\_\_.



9

6. The angle of depression from the top of a tower to a boulder on the ground is  $38^\circ$ . If the tower is 25m high, how far from the base of the tower is the boulder?

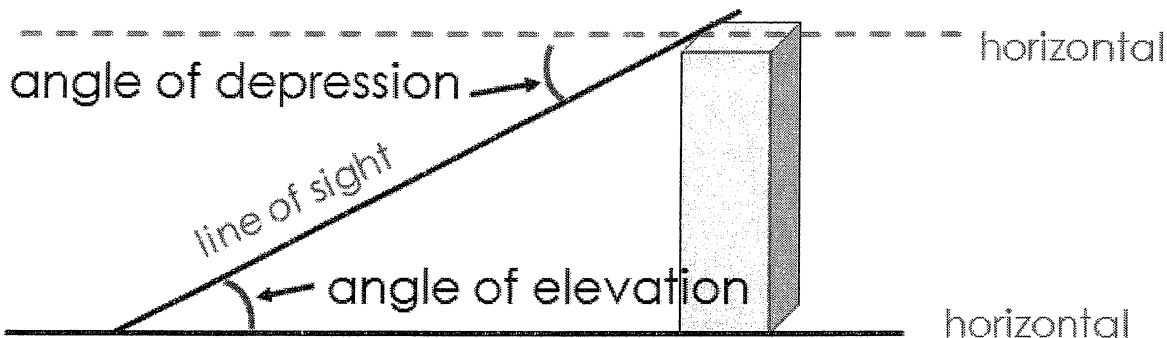


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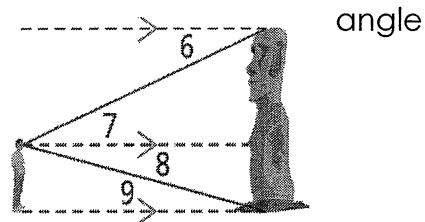
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## Trig Application Problems

### Angle of Elevation & Angle of Depression



1. Classify each angle as an angle of elevation or of depression:



2. Over 2 miles (horizontal), a road rises 300 feet (vertical). What is the angle of elevation to the nearest degree?

3. The angle of depression from the top of a tower to a boulder on the ground is  $38^\circ$ . If the tower is 25 meters high, how far from the base of the tower is the boulder? Round to the nearest whole number.

4. Find the angle of elevation to the top of a tree for an observer who is 31.4 meters from the tree if the observer's eye is 1.8 meters above the ground and the tree is 23.2 meters tall. Round to the nearest degree.

5. A 75 foot building casts an 82 foot shadow. What is the angle that the sun hits the building? Round to the nearest degree.

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6. A boat is sailing and spots a shipwreck 650 feet below the water. A diver jumps from the boat and swims 935 feet to reach the wreck. What is the angle of depression from the boat to the shipwreck, to the nearest degree?

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7. A 5 ft tall bird watcher is standing 50 feet from the base of a large tree. The person measures the angle of elevation to a bird on top of a tree as  $71.5^\circ$ . How tall is the tree? Round to the nearest tenth.

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8. A block slides down a  $45^\circ$  slope for a total of 2.8 meters. What is the change in the height of the block? Round to the nearest tenth.

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9. A projectile has an initial horizontal velocity of 5 meters per second and an initial vertical velocity of 3 meters per second upwards. At what angle was the projectile fired, to the nearest degree?

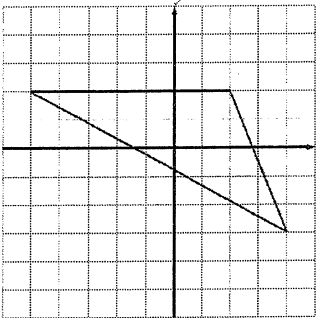
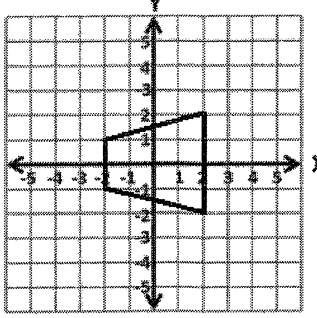
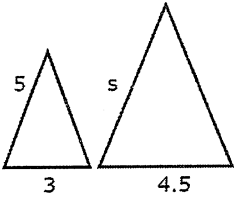
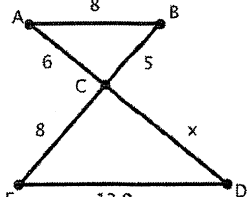
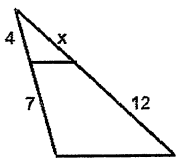
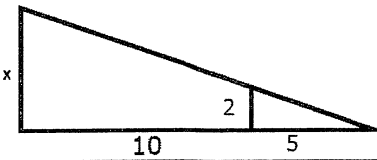
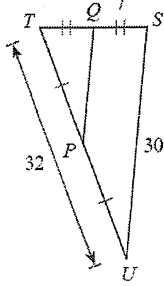
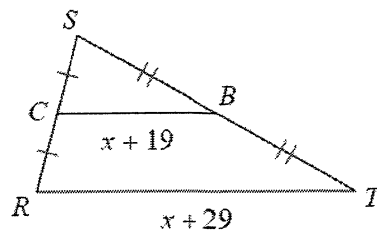
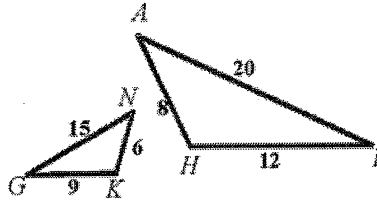
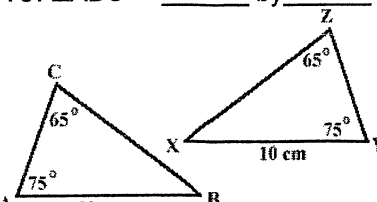
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10. A construction worker leans his ladder against a building making a  $60^\circ$  angle with the ground. If his ladder is 20 feet long, how far away is the base of the ladder from the building to the nearest tenth?

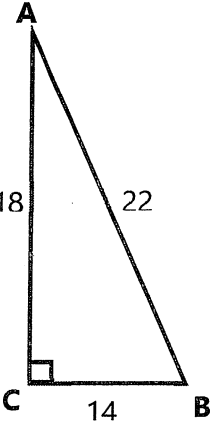
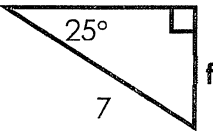
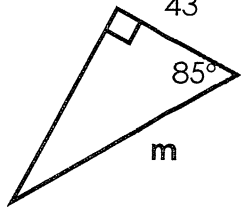
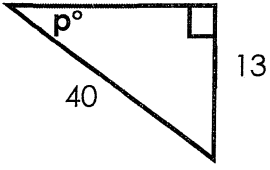
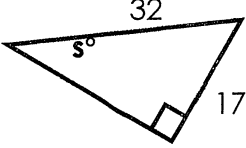
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Use the following to review for you test. Work the Practice Problems on a separate sheet of paper.

What you need to know & be able to do	Things to remember		
<p>A. Perform a dilation with a given scale factor</p>	<p>When the center of dilation is the origin, you can multiply each coordinate of the original figure, or pre- image, by the scale factor to find the coordinates of the dilated figure, or image.</p>	<p>1. Dilate with <math>k = \frac{1}{2}</math>.</p> 	<p>2. Dilate with <math>k = 2</math>.</p> 
<p>B. Find the missing side for similar figures.</p>	<p>Set up a proportion by matching up the corresponding sides. Then, solve for x.</p>	<p>3.</p> 	<p>4.</p> 
		<p>5.</p> 	<p>6.</p> 
<p>C. Midsegment Theorem</p>	<p>The segment connecting the midpoints of two sides of the triangle is parallel to the third side and <math>\frac{1}{2}</math> the length of the third side.</p>	<p>7. Find PQ and TP</p> 	<p>8. Solve for x.</p> 
<p>D. Determine if 2 triangles are similar, and write the similarity statement.</p>	<p>Remember the 3 ways that you can do this: AA, SAS, SSS</p>	<p>9. <math>\triangle GNK \sim</math> _____ by _____</p> 	<p>10. <math>\triangle ABC \sim</math> _____ by _____</p> 



<p>E. Find sin, cos, and tan ratios</p>	<p>Just find the fraction using SOHCAHTOA</p>		<p>11. Find sin A.</p> <p>12. Find tan B.</p> <p>13. Find cos B.</p> <p>14. Find tan A.</p>
<p>F. Know the relationship between the ratios for complementary angles.</p>	<p><math>\sin \theta = \cos(90 - \theta)</math>  <math>\cos \theta = \sin(90 - \theta)</math>  <math>\tan \theta = \frac{1}{\tan(90 - \theta)}</math></p>	<p>15. Given Right <math>\triangle ABC</math> and <math>\sin \theta = 5/13</math>, find <math>\sin(90 - \theta)</math> and <math>\cos(90 - \theta)</math>.</p>	
<p>G. Use trig to find a missing side measure</p>	<p>Set up the ratio and then use your calculator.                   If the variable is on the top, multiply.                  If the variable is on the bottom, divide.</p>	<p>16. Find f.</p> 	<p>17. Find m.</p> 
<p>H. Use trig to find a missing angle measure</p>	<p>Tap the trig button twice to get the INVERSE then type in the ratio.</p>	<p>18. Find p.</p> 	<p>19. Find s.</p> 
<p>I. Trig Word Problems</p>	<p>Draw the picture.                  Label the sides.                  Set up the ratio, and solve.</p>	<p>20. From 25 feet away from the base of a building, the angle of elevation from the ground to the top of a building is measured to be <math>38^\circ</math>. How tall is the building?</p> <p>21. A kite is 35 feet in the air and the string forms an angle of <math>62^\circ</math> with the ground. How long is the string?</p>	

