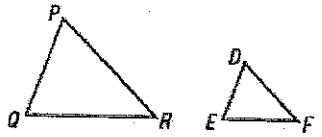
**Geometry Worksheet**
**Similar polygons**
**Name**_____

**1. If polygons are similar then what do you know about the corresponding sides and the corresponding angles?**

Corresponding sides are proportional
Corresponding angles are congruent

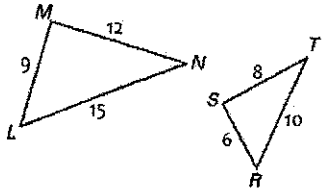
**Given the similar figures, name <u>all pairs</u> of corresponding sides and angles. Look at the similarity statement to help.**

2. $\Delta PQR \sim \Delta DEF$



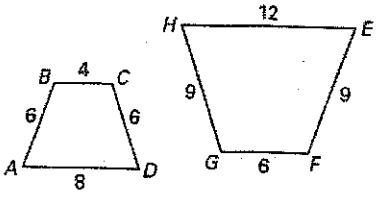

$\overline{QP} \rightarrow \overline{ED}$ $\angle Q \cong \angle E$
$\overline{PR} \rightarrow \overline{DF}$ $\angle P \cong \angle D$
$\overline{RQ} \rightarrow \overline{FE}$ $\angle R \cong \angle F$

3. $\Delta LMN \sim \Delta RST$




$\overline{LM} \rightarrow \overline{RS}$ $\angle L \cong \angle R$
$\overline{MN} \rightarrow \overline{ST}$ $\angle M \cong \angle S$
$\overline{NL} \rightarrow \overline{TR}$ $\angle N \cong \angle T$

4. $ABCD \sim HGFE$




$\overline{AB} \rightarrow \overline{HG}$ $\angle A \cong \angle H$
$\overline{BC} \rightarrow \overline{GF}$ $\angle B \cong \angle G$
$\overline{CD} \rightarrow \overline{FE}$ $\angle C \cong \angle F$
$\overline{DA} \rightarrow \overline{EH}$ $\angle D \cong \angle E$

**Use the similar polygons above to write the statement of proportionality for each:**

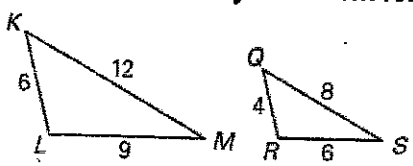
$\frac{QP}{ED} = \frac{PR}{DF} = \frac{RQ}{FE}$

$\frac{LM}{RS} = \frac{MN}{ST} = \frac{NL}{TR}$

$\frac{AB}{HG} = \frac{BC}{GF} = \frac{CD}{FE} = \frac{DA}{EH}$

**Complete the similarity statement for the similar figures and then find the <u>scale factor</u>. REDUCE fractions!**

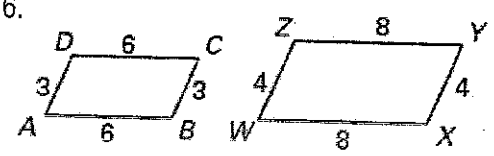
5.




$\Delta LKM \sim \Delta$ RQS

Scale Factor: 2/3

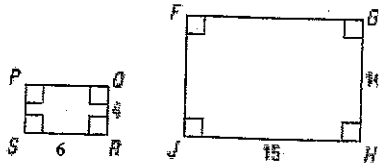
6.




$CBAD \sim$ YXWZ

Scale Factor: 4/3

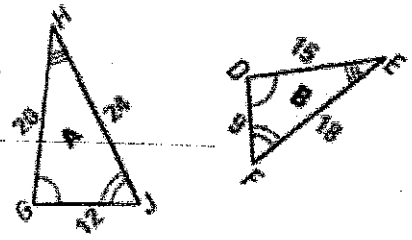
7.




$RSPQ \sim$ HJFG

Scale Factor: 5/2

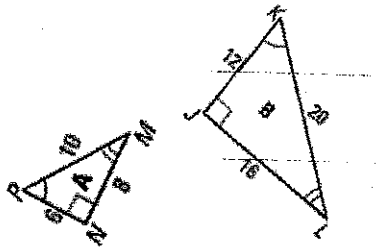
8.




$\Delta HJG \sim \Delta$ EFD

Scale Factor: 3/4

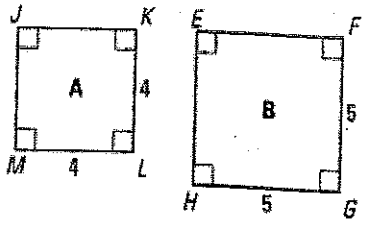
9.




$\Delta NPM \sim \Delta$ JKL

Scale Factor: 2

10.

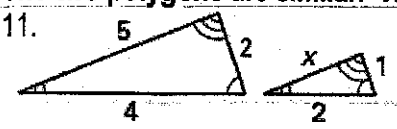



$KJML \sim$ FEHG

Scale Factor: 5/4

**The two polygons are similar. Write a proportion and solve for x.**

11.



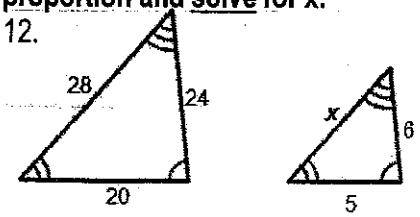

$\frac{5}{x} = \frac{2}{1}$

$2x = 5$

$x = 5/2 = 2.5$

$\boxed{X = 2.5}$

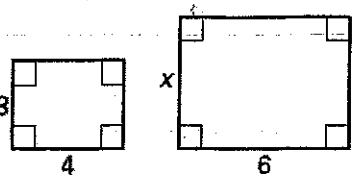
12.




$\frac{28}{x} = \frac{24}{6}$

$\frac{28}{x} = \frac{4}{1}$ $\boxed{X = 7}$

13.



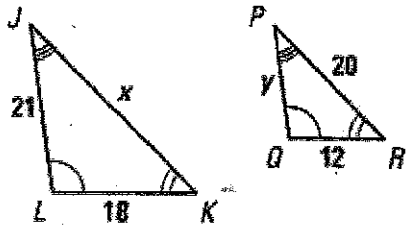

$\frac{3}{x} = \frac{4}{6}$

$18 = 4x$

$\boxed{x = 4.5}$

**Complete the similarity statement for the similar figures and then find the scale factor . Next, write proportions and SOLVE for the missing lengths.**

14.



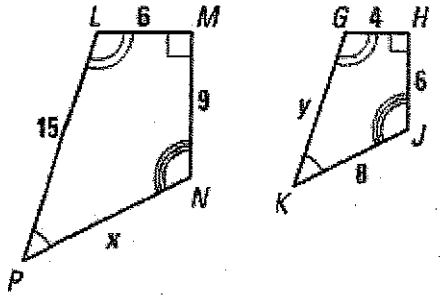

$\triangle LKJ \sim \triangle QRP$

Scale factor = 2/3

$21(2/3) = y$ $\frac{2}{3}x = 20$

$14 = y$ $x = 30$

15.



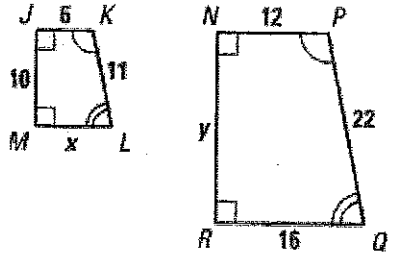

$PLMN \sim KGHJ$

Scale factor = 2/3

$15(2/3) = y$ $\frac{2}{3}x = 8$

$10 = y$ $x = 12$

16.



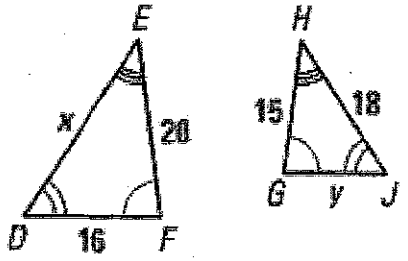

$JKLM \sim NPQR$

Scale factor = 2

$10(2) = y$ $x(2) = 16$

$\boxed{Y = 20}$ $\boxed{x = 8}$

17.




$\triangle FDE \sim \triangle GJH$

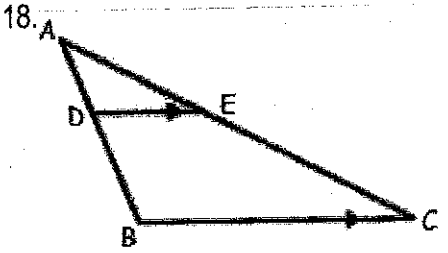
Scale factor = $\frac{15}{20} = \frac{3}{4}$

$\frac{3}{4}x = 18$ $16(\frac{3}{4}) = y$

$x = 24$ $y = 12$

**Are these triangles similar by the AA~ Postulate? Answer yes or no. If the triangles are similar, write statement.**

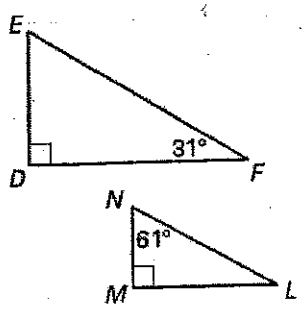
18.




Similar: (YES) NO

$\Delta ADE \sim \Delta ABC$

19.

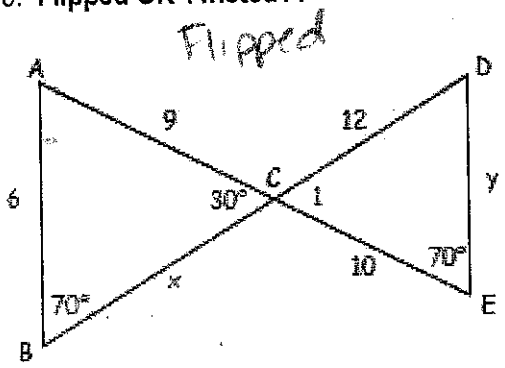



Similar: YES (NO)

$\Delta EDF \sim \Delta$ _____

**Find the angle measurements and set up proportions to find all missing side lengths. Notice the trian similar by AA~.**

20. **Flipped OR Twisted??**




$m\angle 1 = 30°$ $m\angle A = 80°$ $m\angle D = 80°$

Proportion to find **x**:

$\frac{x}{10} = \frac{9}{12}$

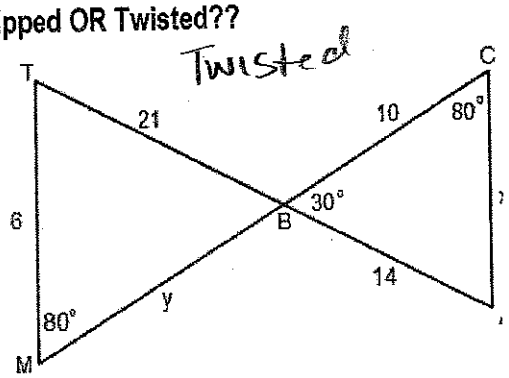
$x = 7.5$

Proportion to find **y**:

$\frac{6}{y} = \frac{9}{12}$

$y = 8$

21. **Flipped OR Twisted??**




$m\angle A = 70°$ $m\angle TBM = 30°$ $m\angle T$

Proportion to find **x**:

$\frac{x}{6} = \frac{14}{21}$

$\frac{x}{6} = \frac{2}{3}$

$x = 4$

Proportion

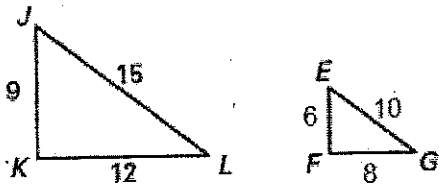
$\frac{y}{10} =$

$\frac{y}{10} =$

$y = 20/3$

**Given two similar figures, find the scale factor and the ratio of the perimeters from the SMALL to the**

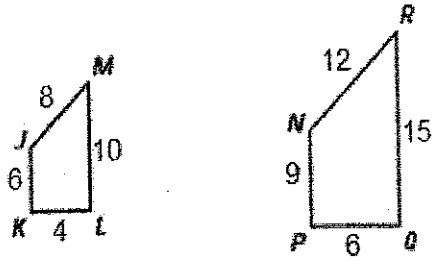
22.




Scale Factor: $\frac{9}{6} = \frac{3}{2}$

Ratio of Perimeters: $\frac{36}{24} = \frac{3}{2}$

23.




Scale Factor: $\frac{10}{15} = \frac{2}{3}$

Ratio of Perimeters: $\frac{28}{42} = \frac{2}{3}$

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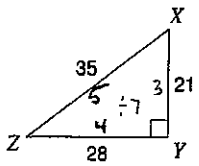
Name_____

# Trigonometric Ratios

Date_____ Period____

**Find the value of each trigonometric ratio.**

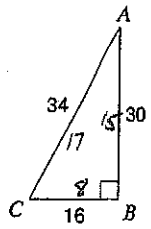
1) tan $Z$




3/4

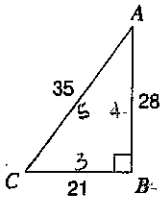
2) cos $C$

8/17



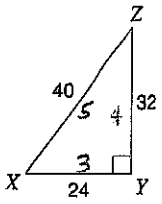

3) sin $C$

4/5



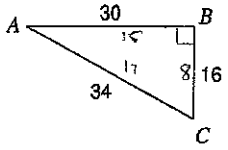

4) tan $X$

4/3



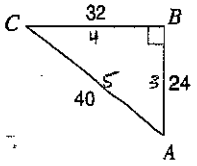

5) cos $A$

15/17



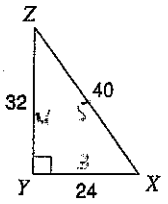

6) sin $A$

4/5



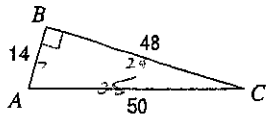

7) sin $Z$

3/5



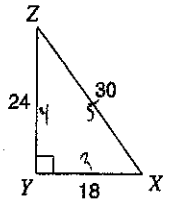

8) sin $C$

7/25



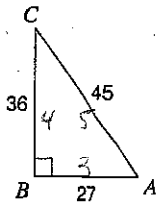

9) cos $Z$

4/5




10) tan $C$

3/4



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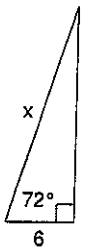
Name_____

# Solving Right Triangles

Date_____ Period____

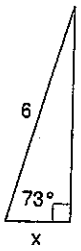
**Find the missing side. Round to the nearest tenth.**

1) 


$\cos 72 = \frac{6}{x}$

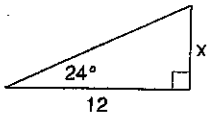
$6 \div \cos 72 = x$

$x \approx 19.4$

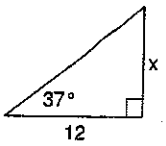
2) 


$\cos 73 = \frac{x}{6}$

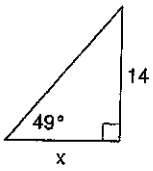
$x \approx 1.75$

3) 

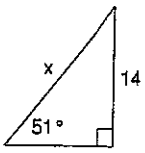

$\tan 24 = \frac{x}{12}$

4) 

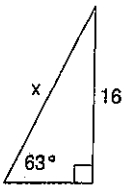

$\tan 37 = \frac{x}{12}$

5) 

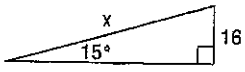

$\tan 49 = \frac{14}{x}$

6) 


$\sin 51 = \frac{14}{x}$

7) 


$\sin 63 = \frac{16}{x}$

8) 


$\sin 15 = \frac{16}{x}$

Name: Period: Date:

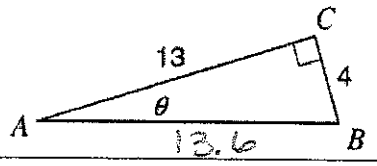
# Practice Worksheet: Right Triangle Trigonometry

Find the exact value of the trig ratio for $\theta$. Simplify all radicals and rationalize denominators if needed.

**1. Find $\cos\theta$.**

$13^2 + 4^2 = c^2$

$\cos\theta = \frac{13}{13.6}$

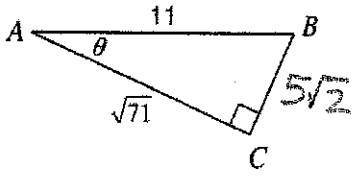



**2. Find $\sin\theta$.**

$\sin\theta = \frac{5\sqrt{2}}{11}$

$\sqrt{71}^2 + b^2 = 11^2$

$71 + b^2 = 121$



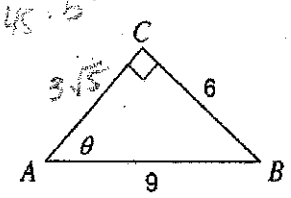

**3. Find $\tan\theta$.**

$\tan\theta = \frac{6}{3\sqrt{5}}$

$= \frac{6\sqrt{5}}{15}$

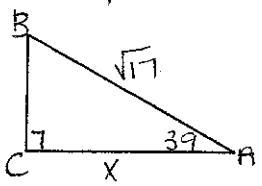
$81 - 36 = b^2$

$45 = b^2$




Label the sketch and solve right $\Delta ABC$ using the given info. Round answers to two decimals.

**4.** $m\angle A = 39^\circ$ $a = 2.6$
$m\angle B = 51^\circ$ $b = 3.2$
$m\angle C = 90^\circ$ $c = \sqrt{17}$




Triangle Sum Thm. to find missing angle:

$90 - 39 = 51^\circ$

Trig ratio to find missing side:

$\cos 39 = \frac{x}{\sqrt{17}}$

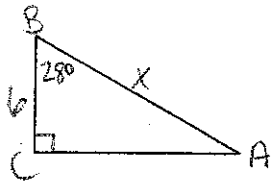
$x = 3.2$

Pythagorean Thm. to find last side:

$x^2 + (3.2)^2 = (\sqrt{17})^2$

$x = 2.6$

**5.** $m\angle A = 62^\circ$ $a = 6$
$m\angle B = 28^\circ$ $b = 3.2$
$m\angle C = 90^\circ$ $c = 6.8$




Triangle Sum Thm. to find missing angle:

$180 - 90 - 28 = 62^\circ$

Trig ratio to find missing side:

$\cos 28 = \frac{6}{x}$

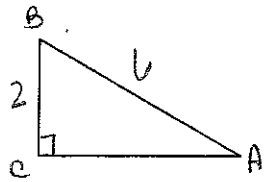
$x = 6.8$

Pythagorean Thm. to find last side:

$6^2 + b^2 = 6.8^2$

$b = 3.2$

**6.** $m\angle A = 19.5^\circ$ $a = 2$
$m\angle B = 70.5^\circ$ $b = 4\sqrt{2}$
$m\angle C = 90^\circ$ $c = 6$




Pythagorean Thm. to find last side:

$6^2 - 2^2 = b^2$

$36 - 4 = \sqrt{32}$

$4\sqrt{2} = b$

Inverse trig function to find missing angle:

$\sin A = \frac{2}{6}$

$A \approx 19.5$

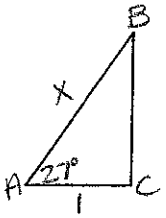
Triangle Sum Thm. to find missing angle:

$90 + 19.5 = 109.5$

$180 - 109.5 = 70.5$

Label the sketch with the given information. Use your sketch to ***write ONE equation*** to find the missing value indicated. Solve that equation, showing all work. Round to two decimal places where needed.

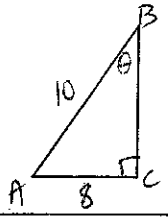
7. Given $m\angle A = 27^\circ$, *and* $b = 1$, *find* $c$.




$\cos 27 = \frac{1}{x}$

$x = 1.12$

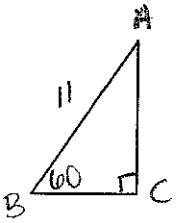
8. Given $b = 8$ *and* $c = 10$, *find* $m\angle B$.




$\sin\theta = \frac{8}{10}$

$\theta = 53.13^\circ$

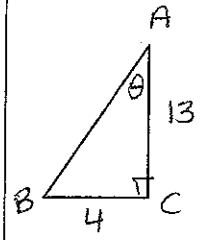
9. Given $m\angle B = 60^\circ$, *and* $c = 11$, *find* $a$.




$a = 5.5$

Special Rt Δ's

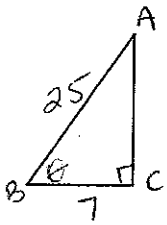
10. Given $a = 4$ *and* $b = 13$, *find* $m\angle A$.




$\tan\theta = \frac{4}{13}$

$\theta \approx 17.1^\circ$

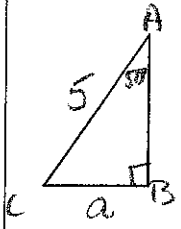
11. Given $a = 7$ *and* $c = 25$, *find* $m\angle B$.




$\cos\theta = \frac{7}{25}$

$\theta = 73.74^\circ$

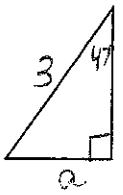
12. Given $m\angle A = 50^\circ$, *and* $b = 5$, *find* $a$.




$\sin 50^\circ = \frac{a}{5}$

$a \approx 3.83$

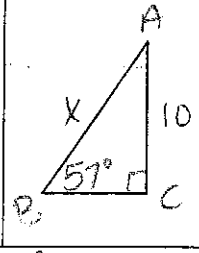
13. Given $m\angle A = 47^\circ$, *and* $c = 3$, *find* $a$.




$\sin 47^\circ = \frac{a}{3}$

$a \approx 2.2$

14. Given $m\angle B = 57^\circ$, *and* $b = 10$, *find* $c$.



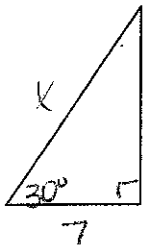

$\sin 57 = \frac{10}{x}$

$x \approx 11.92$

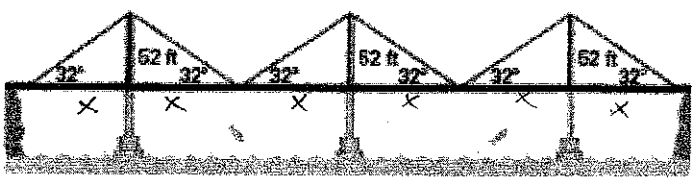
15. A ladder leaning against a house makes an angle of 30° with the ground. The foot of the ladder is 7 feet from the foot of the house. How long is the ladder? Show all work and label the sketch.

$\cos 30 = \frac{7}{x}$

$x \approx 8.08$




16. Find the length across the suspension bridge. Show all work.




$\tan 32 = \frac{52}{x}$ adj

$x = 83.22$

$x \approx 499.32$ ft

Length of Bridge $= 6x = 6(83.22)$

Bridge is ≈ 500ft Longer

Regents Exam Questions G.SRT.C.6: Trigonometric Ratios 1b Name: _____
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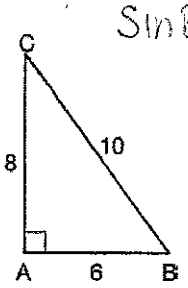
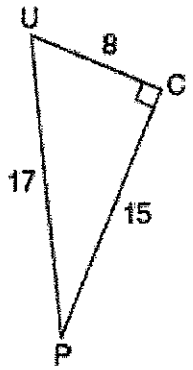
## G.SRT.C.6: Trigonometric Ratios 1b

1 In $\triangle ABC$ below, the measure of $\angle A = 90°$, $AB = 6$, $AC = 8$, and $BC = 10$.



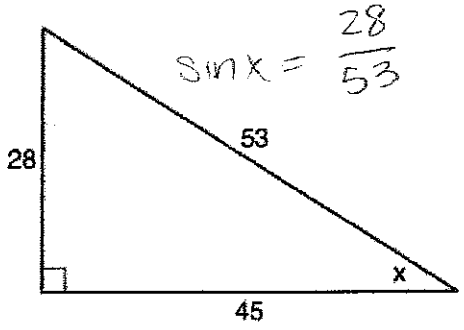

Which ratio represents the sine of $\angle B$?

2 The diagram below shows right triangle $UPC$.

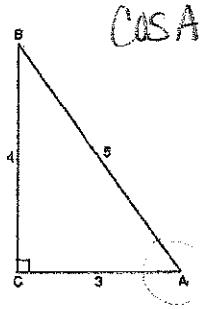



Which ratio represents the sine of $\angle U$?

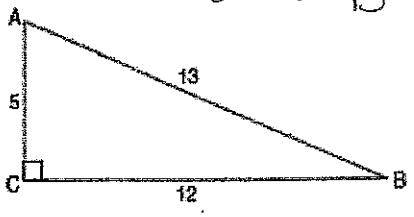
3 Which ratio represents $\sin x$ in the right triangle shown below?



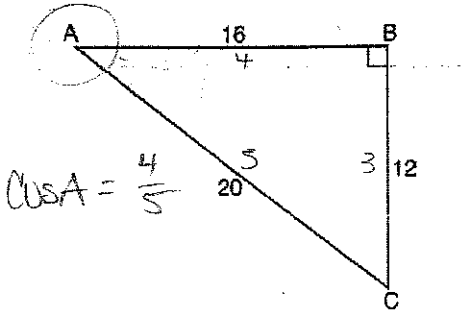

4 Which ratio represents the cosine of angle $A$ in the right triangle below?




5 Which ratio represents $\cos A$ in the accompanying diagram of $\triangle ABC$?



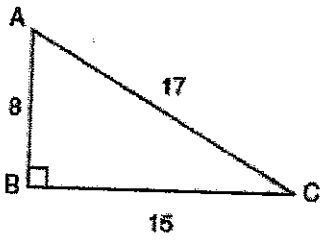

6 In right triangle $ABC$ shown below, what is the value of $\cos A$?



Regents Exam Questions G.SRT.C.6: Trigonometric Ratios 1b
www.jmap.org

Name: _____

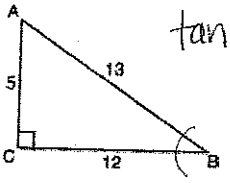
7 In the accompanying diagram of right triangle $ABC$, $AB = 8$, $BC = 15$, $AC = 17$, and $m\angle ABC = 90$.




What is $\tan\angle C$?

$\tan C = \frac{8}{15}$

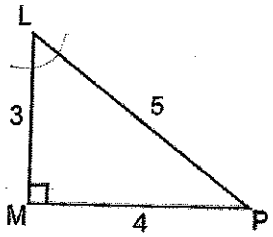
8 The diagram below shows right triangle $ABC$.




$\tan B = \frac{5}{12}$

Which ratio represents the tangent of $\angle ABC$?

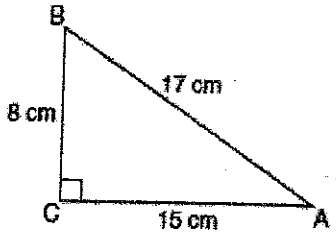
9 The diagram below shows right triangle $LMP$.




Which ratio represents the tangent of $\angle PLM$?

$\tan L = \frac{4}{3}$

10 Which equation shows a correct trigonometric for angle $A$ in the right triangle below?



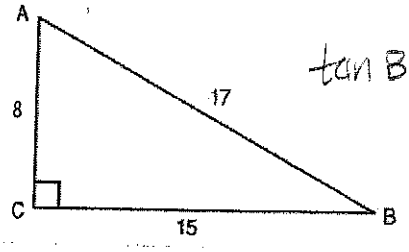

1) $\sin A = \frac{15}{17}$

2) $\tan A = \frac{8}{17}$

3) $\cos A = \frac{15}{17}$

4) $\tan A = \frac{5}{8}$

11 Right triangle $ABC$ has legs of 8 and 15 and a hypotenuse of 17, as shown in the diagram belov



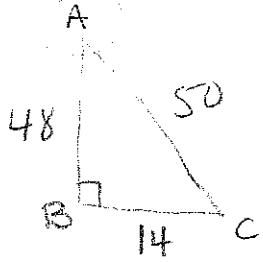

$\tan B =$

The value of the tangent of $\angle B$ is

12 In triangle $MCT$, the measure of $\angle T = 90°$, $MC = 85$ cm, $CT = 84$ cm, and $TM = 13$cm. Which ratio represents the sine of $\angle C$?

13/8

13 In $\triangle ABC$, the measure of $\angle B = 90°$, $AC = 50$, $AB = 48$, and $BC = 14$. Which ratio represents th tangent of $\angle A$?

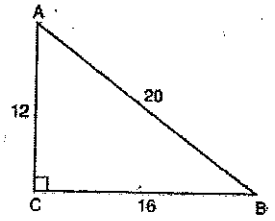



$\tan A = \frac{14}{48}$

$\frac{7}{2}$

Name: _____

14 In right triangle $ABC$ shown below, $AC = 12$, $BC = 16$, and $AB = 20$.




Which equation is *not* correct?

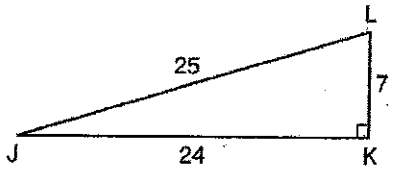
1) $\cos A = \frac{12}{20}$ ✓

2) $\tan A = \frac{16}{12}$ ✓

3) $\sin B = \frac{12}{20}$ ✓

4) $\tan B = \frac{16}{20}$ not correct

15 In right triangle $JKL$ in the diagram below, $KL = 7$, $JK = 24$, $JL = 25$, and $\angle K = 90°$.




Which statement is *not* true?

1) $\tan L = \frac{24}{7}$ ✓

2) $\cos L = \frac{24}{25}$ NOT correct

3) $\tan J = \frac{7}{24}$

4) $\sin J = \frac{7}{25}$

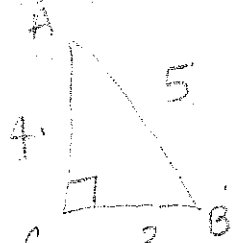
16 In $\triangle ABC$, $m\angle C = 90$. If $AB = 5$ and $AC = 4$, which statement is *not* true?

1) $\cos A = \frac{4}{5}$ ✓

2) $\tan A = \frac{3}{4}$ ✓

3) $\sin B = \frac{4}{5}$ ✓

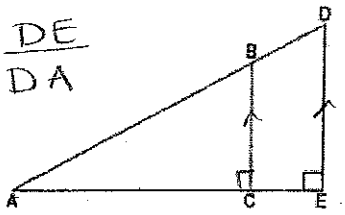
4) $\tan B = \frac{5}{3}$




Not Correct

17 In the diagram of right triangle $ADE$ below, $\overline{BC} \parallel \overline{DE}$.

Sin A
$\frac{BC}{BA}$ or $\frac{DE}{DA}$




Which ratio is always equivalent to the sine of $\angle A$?

1) $\frac{AD}{DE}$ ✗

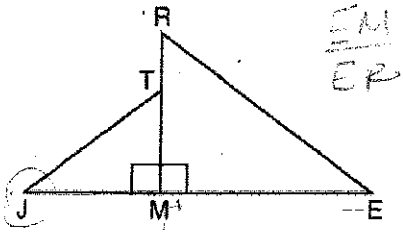
2) $\frac{AE}{AD}$ ✗

3) $\frac{BC}{AB}$ ✓

4) $\frac{AB}{AC}$ ✗

18 In the diagram below, $\triangle ERM \sim \triangle JTM$.

$\frac{JM}{JT}$ $\frac{EM}{ER}$




Which statement is always true?

1) $\cos J = \frac{RM}{RE}$

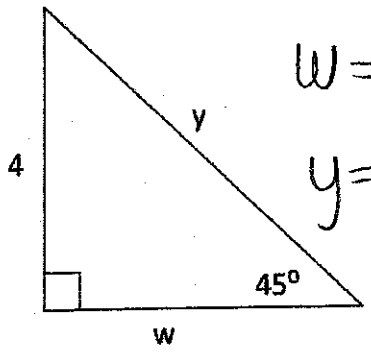
2) $\cos R = \frac{JM}{JT}$

3) $\tan T = \frac{RM}{EM}$

4) $\tan E = \frac{TM}{JM}$

5.8 Special Right Triangles Worksheet Name: Key

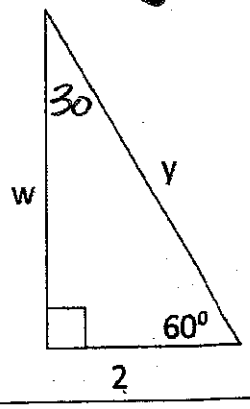
1.




$w = 4$

$y = 4\sqrt{2}$

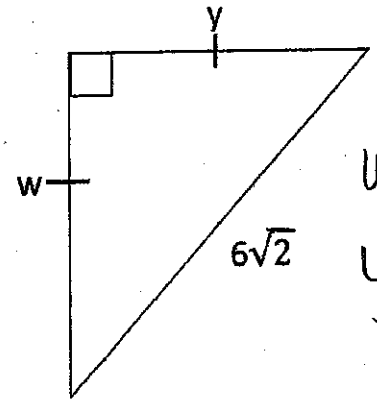
2.




$w = 2\sqrt{3}$

$y = 4$

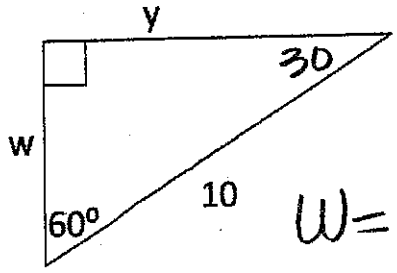
3.




$w = 6$

$y = 6$

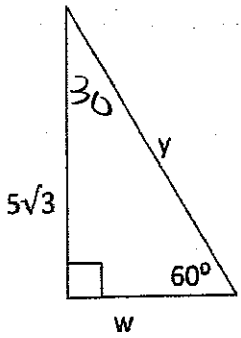
4.




$w = 5$

$y = 5\sqrt{3}$

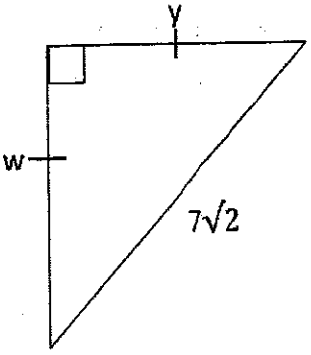
5.




$w = 5$

$y = 10$

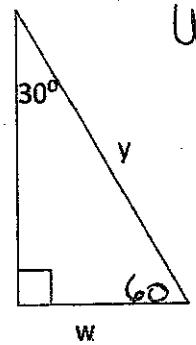
6.




$w = 7$

$y = 7$

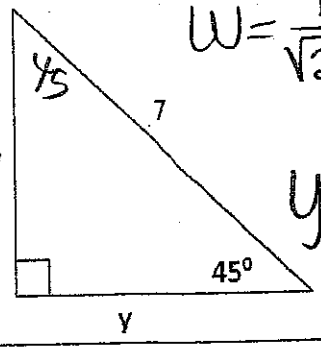
7.




$w = \frac{10}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{10\sqrt{3}}{3}$

$y = \frac{20\sqrt{3}}{3}$

8.

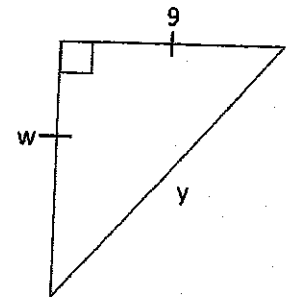



$w = \frac{7}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{2}$

$y = \frac{7\sqrt{2}}{2}$

5.8 Special Right Triangles Worksheet Name: _____

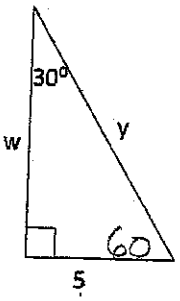
9.




$w = 9$

$y = 9\sqrt{2}$

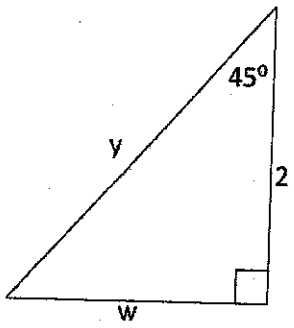
10.




$w = 5\sqrt{3}$

$y = 10$

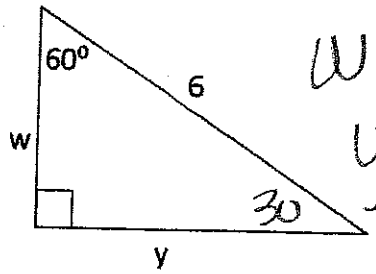
11.




$w = 2$

$y = 2\sqrt{2}$

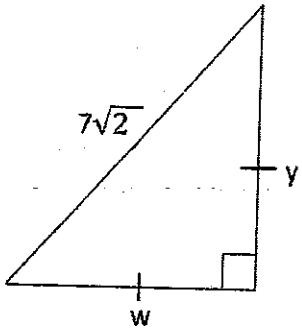
12.




$w = 3$

$y = 3\sqrt{3}$

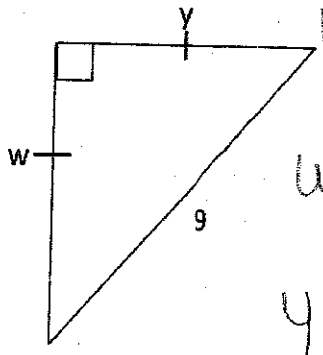
13.




$w = 7$

$y = 7$

14.




$w = \frac{9}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

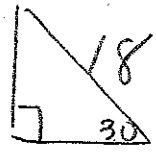
$w = \frac{9\sqrt{2}}{2}$

$y = \frac{9\sqrt{2}}{2}$

15. The shortest side of a 30°-60°-90° triangle is 15. Find the lengths of the other sides.

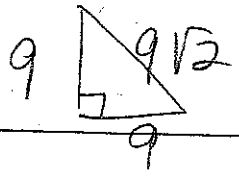

$15\sqrt{3}$ and 30

16. The hypotenuse of a 30°-60°-90° triangle is 18. Find the lengths of the other sides.




9 and $9\sqrt{3}$

17. One leg of a 45°-45°-90° triangle is 9. Find the lengths of the other sides.




9 and $9\sqrt{2}$

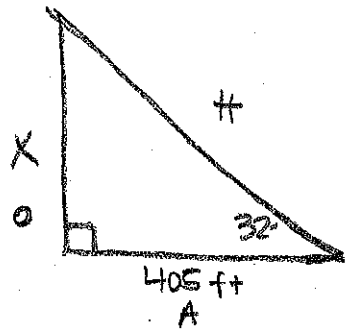
* All Answers Rounded to the nearest whole *

**Worksheet 8.4 Trig Word Problems**
Geometry Regular

Name _____
Date _____ Mods____

Draw a picture, label, and show the trig function used to solve.

1. A monument stands on level ground. The angle of elevation to the top of the monument taken at a point 405 feet away is 32°. Find the height of the monument.

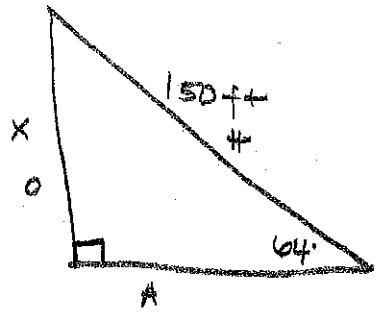



$\tan 32 = \frac{x}{405}$

$405 \tan 32 = x$

253 ft = X

2. A boy flying a kite lets out 150 feet of string that makes an angle of 64° with the ground. If the string forms a straight line, how high is the kite above the ground?

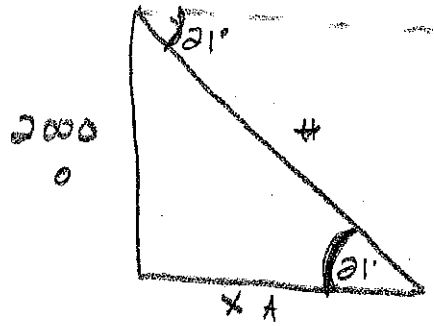



$\sin 64 = \frac{x}{150}$

$150 \sin 64 = x$

121 ft = X

3. A person in a balloon which is 2,000 feet above the airport finds that the angle of depression to a ship out at sea is 21°. Find the horizontal distance between the balloon and the ship. (or the distance from the airport to the ship)

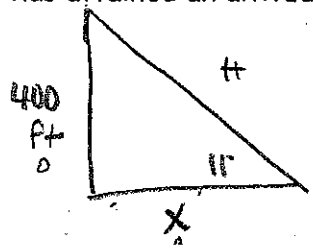



$\tan 21 = \frac{2000}{x}$

$x = \frac{2000}{\tan 21}$

X = 6210 ft

4. An airplane climbs at an angle of 11° with the ground. Find the distance it has traveled when it has attained an altitude of 400 feet.

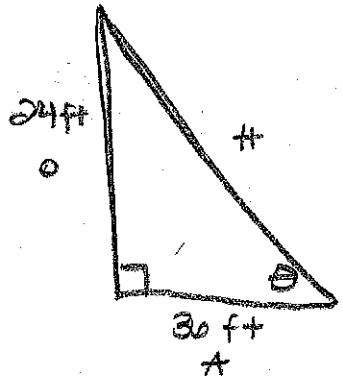



$\tan 11 = \frac{400}{x}$

$x = \frac{400}{\tan 11}$

X = 2,058 ft

5. Find the angle of elevation of the sun when a 24 foot tree casts a shadow of 36 feet.

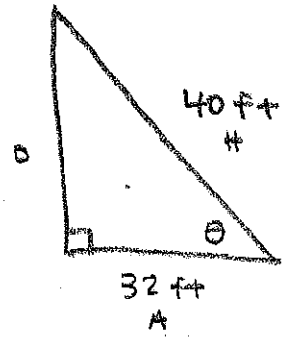



$\tan\theta = \frac{24}{36}$

$\tan^{-1}\left(\frac{24}{36}\right) = \theta$

$34^\circ = \theta$

6. A 40 foot ladder is leaning against a building. The foot of the ladders is 32 feet from the building. Find the angle that the ladder makes with the building.

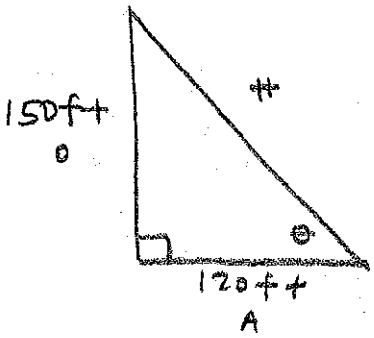



$\cos\theta = \frac{32}{40}$

$\cos^{-1}\left(\frac{32}{40}\right) = \theta$

$37^\circ = \theta$

7. A television tower is 150 feet high and an observer is 120 feet from the base of the tower. Find the angle of elevation to the top of the tower from the place where the observer is standing.

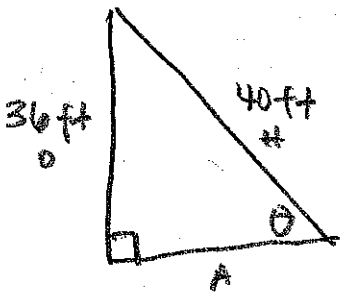



$\tan\theta = \frac{150}{120}$

$\tan^{-1}\left(\frac{150}{120}\right) = \theta$

$51^\circ = \theta$

8. A 40 foot ladder which is leaning against a wall reaches the wall at a point 36 feet from the ground. Find the angle that the ladder makes with the ground.




$\sin\theta = \frac{36}{40}$

$\sin^{-1}\left(\frac{36}{40}\right) = \theta$

$64^\circ = \theta$