RIGHT TRIANGLES

I can define, identify and illustrate the following terms:
Square root  radicals  Rationalize  Pythagorean Theorem  Special Right Triangles
Sine  Cosine  Tangent  $\theta$ (Theta)  Angle of depression
Cosecant  Secant  Cotangent  Angle of elevation

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

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<th>Tuesday</th>
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<th>Friday</th>
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<td>11</td>
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<td>8</td>
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<td>30°-60°-90° Triangles</td>
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Tuesday, 1/8/13

Simplifying and Rationalizing Radicals
- I can review simplifying radicals.
- I can simplify radicals by rationalizing the denominator.

PRACTICE: Radical Worksheet

Wednesday, 1/9/13 or Thursday, 1/10/13

Pythagorean Theorem and 45°-45°-90° Triangles
- I can use the Pythagorean Theorem to solve for the missing side of a triangle, and leave my answer in simplest radical form.
- I can explain the difference between an exact answer and an approximate answer, and tell what situations are best for each.
- I know and can apply the 45°-45°-90° triangle pattern.

PRACTICE: Pg. 353 #15-16, 18-20, 22-27, 29 & 45°-45°-90° Worksheet

Friday, 1/11/13

30°-60°-90° Triangles
- I know and can apply the 30°-60°-90° triangle pattern.

PRACTICE: 30°-60°-90° Worksheet

Monday, 1/14/13

Mixed Practice and Problem Solving
- I can decide which pattern or theorem to use to solve a problem.

PRACTICE: Mixed Applications Worksheet
Tuesday, 1/15/12

8-2: Trigonometric Ratios

☐ I can write a trig ratio.
☐ I can set up an equation using trig ratios.
☐ I can set up an equation using trig ratios to solve a real world problem.

PRACTICE: Introduction to Trigonometry Worksheet

Wednesday, 1/16/13 or Thursday, 1/17/13

8-3: Solving Right Triangles

☐ I can use a calculator to find the decimal value of a given trigonometric ratio.
☐ I can use a calculator to find the angle for a given trigonometric ratio.
☐ I can solve a trigonometric equation.

PRACTICE: Pg 529 #23-43 (odd), 44-50 & Pg 538 #30-35, 69-70 & Trig Applications Worksheet

(assigned problems)

Friday, 1/18/13

➡ QUIZ: Right Triangles

Tuesday 1/22/13

Review

PRACTICE: Review Worksheet

If you need more practice, try p 369 # 47-62 & pg 573 – 574, #12 – 23. (Answers are in the back.)

Wednesday, 1/23/13 or Thursday, 1/24/13

➡ Test: Special Right Triangles

I can demonstrate knowledge of ALL previously learned material.
Radical Operations: Simplifying, Multiplying, and Dividing

Review of Simplifying and Multiplication

To simplify $\sqrt{90}$:

- First do a factor tree of 90
- Then find your pairs/perfect squares and square root them to move them outside.
- Finally multiply all numbers inside the radical together and all numbers outside the radical together.

$7\sqrt{90}$

1. $\sqrt{18}$
2. $\sqrt{28}$
3. $3\sqrt{27}$
4. $-5\sqrt{108}$

5. $\sqrt{6^2}$
6. $\sqrt{3^5}$
7. $\sqrt{t^2}$
8. $\sqrt{r^9}$
9. $\sqrt{12x^3}$

To multiply $3\sqrt{7} * -4\sqrt{3}$:

- First simplify each separate radical if needed
- Then multiply all numbers inside the radical together and all numbers outside the radical together
- Finally simplify again if needed

Multiply. Simplify your answer.

13. $(-\sqrt{36})^2$
14. $- (\sqrt{9})^2$
15. $(\sqrt{14})(\sqrt{7})$
16. $(\sqrt{6})(-\sqrt{30})$

17. $\sqrt{11} * \sqrt{11}$
18. $-\sqrt{6} * \sqrt{6}$
19. $(-\sqrt{36})^2$
20. $- (\sqrt{9})^2$
21. \(-(\sqrt{7})^2\)  
22. \(\sqrt{7} \times \sqrt{3}\)  
23. \((\sqrt{14})(\sqrt{7})\)  
24. \((\sqrt{6})(-\sqrt{30})\)  

25. \(-\sqrt{11} \times \sqrt{22}\)  
26. \(-\frac{3}{2} \sqrt{2}(-\sqrt{60})\)  
27. \(-8\sqrt{108} \times 2\sqrt{6}\)  
28. \((\sqrt{54})(-\sqrt{20})\)  

29. \(\sqrt{30} \times \sqrt{8} \times \sqrt{18}\)  
30. \((2\sqrt{14})(8\sqrt{27})(15\sqrt{15})\)  

**Review of Division**  
To divide \(\frac{5\sqrt{10}}{3\sqrt{2}}\):  
- First simplify each separate radical if needed  
- Then if possible divide the radicands together and the numbers outside the radical together.  
- Finally if needed simplify again.  

\[
\frac{\sqrt{27}}{\sqrt{3}} \quad \frac{\sqrt{48}}{\sqrt{6}} \quad \frac{8\sqrt{15}}{5\sqrt{3}} \quad \frac{11\sqrt{55}}{\sqrt{11}}
\]  

Hint: \(\sqrt{10} \div \sqrt{2}\) or \(\frac{\sqrt{10}}{\sqrt{2}}\) means the same thing!!
Radical Operations: Rationalizing

**Rationalize**
You rationalize when there is a radical in the denominator of the fraction that does not simplify out on its own (like yesterday’s division problems).

- First try to simplify with division
- Is there still a radical in the denominator? If so, multiply by 1 in its “clever form of 1”. This means to create a fraction that is equivalent to one using that radical.

For \( \frac{1}{\sqrt{5}} \) the “clever form of 1” is \( \frac{\sqrt{5}}{\sqrt{5}} \) so our problem will look like \( \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5} \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} \).

Now we simplify and get \( \frac{\sqrt{5}}{5} \).

5. \( \frac{1}{\sqrt{17}} \)
6. \( \frac{11}{\sqrt{11}} \)
7. \( \frac{\sqrt{98}}{\sqrt{2}} \)
8. \( \frac{\sqrt{7}}{\sqrt{11}} \)

Divide or rationalize. Simplify your answer.

9. \( \frac{\sqrt{98}}{\sqrt{2}} \)
10. \( \frac{\sqrt{48}}{\sqrt{6}} \)
11. \( \frac{\sqrt{7}}{\sqrt{11}} \)
12. \( \frac{2\sqrt{11}}{3\sqrt{5}} \)
13. \( \frac{24}{\sqrt{6}} \)
14. \( \frac{1}{\sqrt{28}} \)
15. \( \frac{10}{3\sqrt{2}} \)
16. \( \frac{\sqrt{96}}{\sqrt{54}} \)
17. \( \frac{6}{\sqrt{48}} \)
18. \( \frac{8\sqrt{15}}{5\sqrt{2}} \)
19. \( \frac{1}{\sqrt{5}} \)
20. \( \frac{17}{\sqrt{85}} \)
I. **Pythagorean Theorem**

In a _____ triangle, you can use the ___________ __________ to solve for any missing side as long as you know the other _____ sides. The Pythagorean Theorem is ___________________, where ____ is the ___________ (longest side).

Ex. 1a) What variable represents the hypotenuse?  

   b) If $p = 8$ and $r = 15$ then $w = \underline{\hspace{2cm}}$.

Ex. 2a) What variable represents the hypotenuse?  

   b) If $p = 25$ and $r = 24$ then $w = \underline{\hspace{2cm}}$.

II. **Hidden and Double Pythagorean Theorem - Round all answers to the nearest hundredths.**

Sometimes the _____ triangle can be _____ inside of another shape(s).

Other times, you might have to do the Pythagorean Theorem more than _____.

---

Ex. 1a) What variable represents the hypotenuse?  

   b) If $p = 8$ and $r = 15$ then $w = \underline{\hspace{2cm}}$.

Ex. 2a) What variable represents the hypotenuse?  

   b) If $p = 25$ and $r = 24$ then $w = \underline{\hspace{2cm}}$.
Recall: By the Triangle Inequality Theorem, the sum of any two side lengths of a triangle is greater than the third side length.

III. Determining if a triangle is a right triangle.

A triangle is a ______ triangle if _____ + _____ = ______, when ___ is the longest side.

Ex. 1)  5, 16, 15  
Ex. 2)  3, 5, $\sqrt{34}$

Tell whether each triangle described is a right triangle. The lengths of the three sides are given.

1)  4, 5, 6  
2)  6, 8, 10  
3)  3, 7, 5

4)  1, 2, $\sqrt{5}$  
5)  6, 9, 6  
6)  $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$

IV. Pythagorean Triples

A set of three nonzero whole numbers $a$, $b$, and $c$ such that $a^2 + b^2 = c^2$ is called a Pythagorean triple.

<table>
<thead>
<tr>
<th>Common Pythagorean Triples</th>
</tr>
</thead>
</table>
| 3, 4, 5  
5, 12, 13  
8, 15, 17  
7, 24, 25 |

V. Pythagorean Inequalities

Tell if the measures can be the side lengths of a triangle. If so, classify the triangle as acute, obtuse, or right.

1.  5, 7, 10

2.  5, 8, 17

3.  7, 12, 16

4.  11, 18, 34

5.  3.8, 4.1, 5.2
VI. 45-45-90 NOTES

A diagonal of a square divides it into two congruent isosceles right triangles. Since the base angles of an isosceles triangle are congruent, the measure of each acute angle is 45°. So another name for an isosceles right triangle is a 45°-45°-90° triangle.

A 45°-45°-90° triangle is one type of ________________________________ ________________.

**Theorem 5-8-1  45°-45°-90° Triangle Theorem**

In a 45°-45°-90° triangle, both legs are congruent, and the length of the hypotenuse is the length of a leg times \( \sqrt{2} \).

\[
AC = BC = \ell \quad AB = \ell \sqrt{2}
\]

**Example 1A:** Finding Side Lengths in a 45°- 45°- 90° Triangle

Find the value of \( x \). Give your answer in simplest radical form.

**Example 1B:**

Find the value of \( x \). Give your answer in simplest radical form.

**Example 2:**

Jana is cutting a square of material for a tablecloth. The table’s diagonal is 36 inches. She wants the diagonal of the tablecloth to be an extra 10 inches so it will hang over the edges of the table. What size square should Jana cut to make the tablecloth? Round to the nearest inch.
45-45-90 Triangles **Don’t forget your book work!!**

I. Complete the following table for the 45-45-90 triangles using exact simplified radical values.

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Leg 1</th>
<th>Leg 2</th>
<th>Hypotenuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td>$8\sqrt{2}$</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>$4\sqrt{2}$</td>
<td></td>
</tr>
</tbody>
</table>

II. Fill in the length of each segment in the following figures.

5. 

6. 

7. 

8. 

9. 

10. 

11. 

12. 

13. $3\sqrt{70}$, $3\sqrt{70}$, $12\sqrt{35}$

14. $\sqrt{10}$, $\sqrt{10}$, $2\sqrt{5}$

15. $\sqrt{6}$, $\sqrt{6}$, $\sqrt{3}$

For 13 – 15, tell if the given values could be the sides of a 45°-45°-90° triangle.
16. Sam has a square backyard divided into 2 sections along the 40 foot diagonal. One of these sections is used as a garden. What is the approximate area of the garden?

17. A guy wire supporting a radio tower is positioned 145 feet up the tower. It forms a 45° angle with the ground. About how long is the wire?

18. Find the perimeter and area of a 45°-45°-90° triangle with a hypotenuse length 12 inches. Give your answers in simplest radical form.

19. Find the perimeter and area of a square with diagonal length 18 meters. Give your answers in simplest radical form.

20. This triangle loom is made from wood strips shaped into a 45°-45°-90° triangle. Pegs are placed every 1/2 inch along each leg. Suppose you make a loom with an 18-inch hypotenuse. Approximately how many pegs will you need?

21. Find the value of \( x \) in simplest radical form.

22. Each edge of the cube has length \( e \).
   a. Find the diagonal length \( d \) if \( e = 1 \), \( e = 2 \), and \( e = 3 \). Give the answers in simplest radical form.

23. Solve for the following. Leave answer in simplest radical form.

24. Given \( AC = 10 \), find \( BX \) in simplest radical form.
I. 30-60-90 NOTES

A 30°-60°-90° triangle is another special right triangle.

**Example 1A:** Finding Side Lengths in a 30°-60°-90° Triangle

Find the values of $x$ and $y$. Give your answers in simplest radical form.

**Example 1B:**

Find the values of $x$ and $y$. Give your answers in simplest radical form.

**Example 1C:**

Find the values of $x$ and $y$. Give your answers in simplest radical form.

**Example 1D:**

Find the values of $x$ and $y$. Give your answers in simplest radical form.
30-60-90 Triangles

1. In a 30°-60°-90° triangle, the short leg is located across from what angle?  

Complete the table for a 30°-60°-90° triangle using exact (radical) values.

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Short Leg</th>
<th>Long Leg</th>
<th>Hypotenuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td>$6\sqrt{3}$</td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td>$2\sqrt{3}$</td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td>$10y\sqrt{3}$</td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td>7$ab\sqrt{2}$</td>
<td></td>
</tr>
</tbody>
</table>

Fill in the blanks for the special right triangles.

9.  

10.  

11.  

12.  

13.  

14.  

15. $\triangle RJQ$ is equilateral.

16. $\triangle ABC$ is equilateral.

$JQ =$  

$RL =$  

$LQ =$  

$JL =$  

$AD =$  

$DC =$  

$AB =$  

$BC =$  
For 17 – 20, tell if the given values could be the sides of a 30°-60°-90° triangle.

17. 2, $2\sqrt{3}$, 4
18. 9, 3,$3\sqrt{3}$
19. $\sqrt{3}$, 3, $\sqrt{6}$
20. $4\sqrt{6}$, $2\sqrt{6}$, $6\sqrt{2}$

21. The hypotenuse of a 30-60-90 triangle is $12\sqrt{2}$ ft. Find the area of the triangle.

22. Find the perimeter and area of a 30°-60°-90° triangle with hypotenuse length 28 centimeters.

23. Find the perimeter and area of an equilateral triangle with side length 4 feet.

24. Find the perimeter and area of an equilateral triangle with height 30 yards.

25. A skate board ramp must be set up to rise from the ground at 30°. If the height from the ground to the platform is 8 feet, how far away from the platform must the ramp be set?

26. Find the value of $x$ in simplest radical form.

27. Find QR and PS. Answer in simplest radical form.

28. Solve for the following. Leave answer in simplest radical form.

29. The perimeter of a rectangle is 60 in. The length is four times the width. What is the length of the diagonal?
Mixed Applications – Problem Solving

I. For each problem:
   1) Determine if you should use Pythagorean Theorem, 30°-60°-90°, or 45°-45°-90°
   2) Write the equation or pattern you will use
   3) Show work and find all the missing segment lengths

1. Use: ____________________
   Formula: ________________
   Work and Answer(s):

2. Use: ____________________
   Formula: ________________
   Work and Answer(s):

3. Use: ____________________
   Formula: ________________
   Work and Answer(s):

4. Use: ____________________
   Formula: ________________
   Work and Answer(s):

5. Use: ____________________
   Formula: ________________
   Work and Answer(s):

6. Use: ____________________
   Formula: ________________
   Work and Answer(s):

7. ΔABC is equilateral with perimeter 36y units. Find the length of each side and the height.
   Use: ____________________
   Formula: ________________
   Work and Answer(s):

8. C is the center of a regular hexagon. Find the length of each side.
   Use: ____________________
   Formula: ________________
   Work and Answer(s):
Draw a picture if one is not given and solve the problem.

9. The four blades of a helicopter meet at right angles and are all the same length. The distance between the tips of two adjacent blades is 36 ft. How long is each blade? Round your answer to the nearest tenth.

10. An escalator lifts people to the second floor, 25 ft. above the first floor. The escalator rises at a 30° angle. How far does a person travel from the bottom to the top of the escalator?

11. A slide was installed at the local swimming pool, as shown here. What is the length of the slide?

12. After heavy winds damaged a house, workers placed a 6 m. brace against its side at a 45° angle. Then, at the same spot, they placed a second, longer brace to make a 30° angle with the side of the house.
   a. How far away from the house are the braces placed on the ground?
   b. How long is the longer brace?
   c. How much higher on the house does the longer brace reach than the shorter brace?

*13. Magic Plumbing is needing to ship out a new water pipe to replace a broken one in the Smith’s house. The only box they could find has dimensions of 20 in x 16 in x 12in. The pipe they need to ship is 24 inches long. Will it fit in the box? Explain your answer.
When viewed from above, the base of a water fountain has the shape of a hexagon composed of a square and 2 congruent isosceles right triangles, as represented in the diagram below.

Which of the following measurements best represents the perimeter of the water fountain’s base in feet?

- A $(20 + 20\sqrt{2})$ ft
- B $(20 + 20\sqrt{2})$ ft
- C $(20 + 20\sqrt{2})$ ft
- D $(20 + 20\sqrt{2})$ ft

2. Alex has a square garden in his back yard. If the garden has a diagonal of 18 inches, what is the area of Alex’s square garden?

Nicole is creating a support in the shape of a right triangle. She has a 92 cm-long piece of wood, which is to be used for the hypotenuse. The two legs of the triangular support are of equal length. Approximately how many more centimeters of wood does Nicole need to complete the support?

- A 130 cm
- B 184 cm
- C 260 cm
- D 276 cm

3. The outline of a fence is shown below. The fence is in the shape of a trapezoid and the area of the back yard is 170 ft². How much fencing was used for this yard?

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1. Two identical rectangular doors have glass panes in the top half and each bottom half is made of solid wood. If 1 meter is approximately equal to 3.28 feet, what is the approximate length of $x$ in feet?

- A 5.3 feet
- B 8.5 feet
- C 2.6 feet
- D 7.1 feet
Introduction to Trigonometry

The field of mathematics called Trigonometry is the study of _______ triangles and the ratios between the sides.

There are 3 of these relationships that we study:

- Sine is the ratio of the __________ side to the ____________.
- Cosine is the ratio of the __________ side to the ____________.
- Tangent is the ratio of the ____________ side to the ____________ side.
- The ____________ NEVER changes, but ___________ and ___________ are dependent on the _______ used. The _______ angle is NEVER used.

The three sides of the triangles are referred to as Hypotenuse (H), Adjacent (A), and Opposite (O). Label each side of each triangle using angle W as your reference.

Ex 1. Ex 2. Ex 3.

1. 2. 3.

To help you remember these relationships, you can use the phrase _______ _______ _______.

Where:  S: sine (sin)  O: opposite
        C: cosine (cos)  A: adjacent
        T: tangent (tan)  H: hypotenuse

The trigonometric ratios are written in an equation form. The Greek letter _____________ (θ) is often used to represent an angle. Our angles will always be measured in __________.

\[
\text{Sine } \theta = \text{ __________ }
\]
\[
\text{Cosine } \theta = \text{ __________ }
\]
\[
\text{Tangent } \theta = \text{ __________ }
\]
Use the triangle at the right to determine the following ratios. Be sure to simplify your answers!

Ex 4. \( \sin 40^\circ = \)  
Ex 5. \( \sin \theta = \)

Ex 6. \( \cos 40^\circ = \)  
Ex 7. \( \cos \theta = \)

Ex 8. \( \tan 40^\circ = \)  
Ex 9. \( \tan \theta = \)

Use the triangle at the right to determine the following ratios. Be sure to simplify your answers!

4. \( \sin 40^\circ = \)  
5. \( \sin 50^\circ = \)

6. \( \cos 40^\circ = \)  
7. \( \cos 50^\circ = \)

8. \( \tan 40^\circ = \)  
9. \( \tan 50^\circ = \)

Set up equations using trig ratios that could be used to solve for the variable.

10.  
11.  
12.  

13.  
14.  
15.  

16.  
17.  
18.  
You can also take the reciprocal of each trigonometric function.

The Reciprocal Trigonometric Ratios are as follows:

- **Reciprocal of Sine Function**:
  
  Cosecant (csc) is the ratio of the ___________ side to the ____________.

  Cosecant is also: \( \csc \theta = \frac{1}{\sin \theta} \)

- **Reciprocal of Cosine Function**:
  
  Secant (sec) is the ratio of the ___________ side to the ____________.

  Secant is also: \( \sec \theta = \frac{1}{\cos \theta} \)

- **Reciprocal of Tangent Function**:
  
  Cotangent (cot) is the ratio of the ___________ side to the ____________.

  Cotangent is also: \( \cot \theta = \frac{1}{\tan \theta} \)

Use the triangle at the right to determine the following ratios. Be sure to simplify your answers!

Ex 9. \( \csc \theta = \) \[___\] 
Ex 10. \( \sec \theta = \) \[___\] 
Ex 11. \( \cot \theta = \) \[___\]

1. \( \csc 40^\circ = \) \[___\]
2. \( \sec 40^\circ = \) \[___\]
3. \( \cot 40^\circ = \) \[___\]

Set up equations using trig ratios that could be used to solve for the variable.

19. \[\begin{array}{c}
\text{csc } w^\circ & \text{csc } x^\circ & \text{csc } z^\circ \\
\end{array}\]
20. \[\begin{array}{c}
\text{sec } w^\circ & \text{sec } x^\circ & \text{sec } z^\circ \\
\end{array}\]
21. \[\begin{array}{c}
\text{cot } w^\circ & \text{cot } x^\circ & \text{cot } z^\circ \\
\end{array}\]
EOC Prep Questions
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1. A yield sign is in the shape of an equilateral triangle. Each side of the triangle is 36 inches. Which of the following measurements best represents the area of the yield sign?

   a) $\frac{1}{2}(36)(18\sqrt{3})$
   b) $(36)(18)$
   c) $\frac{1}{2}(36)(36)$
   d) $\frac{1}{2}(36)(36)(\sqrt{3})$

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1. A cube with side lengths of 4 inches is shown below. How could you find the length of $d$, the diagonal of the cube?

   A) $\sqrt{4^2 + (4\sqrt{3})^2} = d^2$
   B) $\sqrt{4^2 + (4\sqrt{3})^2} = d$
   C) $\sqrt{4 + 4} = d^2$
   D) $\sqrt{4 + 4\sqrt{3}} = d^2$

1. Jenna is flying a kite on a very windy day. The kite string makes a $60^\circ$ angle with the ground. The kite is directly above the sandbox, which is 28 feet away from where Jenna is standing. Approximately how much of the kite string is currently being used?

   A 56 feet
   B 48.5 feet
   C 40 feet
   D 14 feet
Trigonometry Applications

Set up equations that could be used to solve each problem.

Step 1: Draw a picture
Step 2: Label picture
Step 3: Pick the best trig ratio
Step 4: Set up equation

Ex. 1 Angie looks up at 25 degrees to see an airplane flying toward her. If the plane is flying at an altitude of 3.5 miles, how far is it from being directly above Angie?

Ex. 2 A six foot vertical pole casts a shadow of 11 feet. What is the angle of elevation with the ground?

Ex. 3 Lauren is at the top of a 15 meter tall lookout tower. She looks down at an angle of depression of 25° and sees Evan coming toward her. How far is Evan from the base of the tower?

1. What is the angle of elevation if you stand 850 feet away from a cliff that is 400 feet high and look at the top?

2. The string of a flying kite makes an angle of 63° with the ground. If all 250 feet of string are out, and there is no sag in the string, how high is the kite?

3. Tal’s hill at Minute Maid Park has an elevation of 30°. If the hill has a six foot vertical rise, how long is its hypotenuse?

Turn the page. Worksheet continues.
4. Joey is putting up an antenna. At the 30 foot mark, he attaches a 50 foot guy wire. What angle does the guy wire form with the antenna?

5. A person at the top of a cliff 100 feet tall sees Gilligan’s boat. His sighting of the boat is at an angle of depression of 10°. How far is the boat from the base of the cliff?

6. A 24 foot ladder is leaned against a wall at 55° with the ground. How far away from the wall is the base of the ladder?

7. A 32 in. bat is leaning against a fence. If the bat is 15 in. away from the base of the fence, what angle is formed between the ground and the bat?

8. A plane takes off at an elevation of 20°. In its path, 500 feet away from the takeoff point, is a 170-ft tall tower. Will the plan clear the tower? If yes, by how much?

9. Ana knows that she is one mile from the base of a tower. Using a protractor she estimates an angle of elevation to be 3°. How tall is the tower to the nearest foot? (1 mile = 5280 feet)

10. The base of an isosceles triangle has a length of 16cm. and the vertex angle measures 68°. What is the length of each leg? Round to the nearest tenth of a cm.

11. Matt hiked to the top of the smaller cliff shown below. From the top, he could see the bottom of the large cliff at an angle of depression of 25°. He could see the top of the large cliff at an angle of elevation of 20°. Find the height of each cliff (x and y).
Pythagorean Theorem and Special Right Triangles Review
(NOT COMPREHENSIVE – GO BACK OVER HOMEWORK!!)

1. The diagonal of a square measures 18 meters. What is the perimeter of the square?

2. A flagpole has cracked 9 feet from the ground and has fallen. The top of the flagpole hit the ground 12 feet from the base. How tall was the flagpole before it fell?

Decide if the measures can be the side lengths of a triangle. If so, classify the triangle as acute, obtuse or right.

3. 10, 12, 16
4. 8, 13, 23
5. 1.5, 2, 2.5
6. 6, 8, 11

Find all the missing sides of each figure.

7. 
8. 
9. 
10.

Simplify Radicals

19. \(\left(5x\sqrt{18y^7}\right)\left(2y\sqrt{5xy^5}\right)\)

20. \(\frac{4c\sqrt{27bc^3}}{\sqrt{2c^2}}\)

Tell whether each set of values could be the sides of a 45-45-90 or 30-60-90, or neither. Be careful since the values are not necessarily simplified nor in any order.

21. \(\sqrt{50}, \sqrt{150}, 10\sqrt{2}\)
22. \(2\sqrt{4}, \sqrt{16}, 2\sqrt{8}\)
23. \(2\sqrt{3}, 2\sqrt{6}, 4\)
Trigonometry Test Review

Solve each problem. You will need to use your own paper. Please remember to round side lengths to the nearest hundredth and angles to the nearest degree.

1. Find $x$ and $y$

\[
\begin{align*}
\text{71°} & \quad \text{42'} \\
\text{67°} & \quad \text{y}
\end{align*}
\]

2.

3.

Solve for $x$.

4.

5.

6.

7. A tree casts a shadow of 28 m. The elevation of the sun is 49°. How tall is the tree?

8. Shane is 61 feet high on a ride at an amusement park. The angle of depression to the park entrance is 42°, and the angle of depression to his friends standing below is 80°. How far from the entrance are his friends standing?

9. A 30 foot tree broke from its base and fell against a house. If the tree hit the house 18 feet above the ground, what angle is the tree forming with the house?

10. A freeway entrance ramp has an elevation of 15°. If the vertical lift is 22 feet, what is the distance along the ramp?

11. Lauren is at the top of a 15 m lookout tower. From an angle of depression of 25°, she sees Evan coming toward her. How far is Evan from the base of the tower?

12. Rosalinda has a rocket that can travel 1500 feet before exploding. On the 4th of July, she lights the rocket at an elevation of 75°. How high will the rocket be when it explodes?

13. Mark has two sticks, 25 in. and 20 in. If he places them end to end perpendicularly, what two acute angles would be formed when he added the hypotenuse?