I'm sorry, Bob, but I'm still looking for Mr. Right.

There are times when being almost right just isn't good enough.
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**Six Weeks 2015-2016**
Simplifying and Multiplying Radicals Review Day 1

Simplify the following radicals. Leave answer in radical form.

1) \(\sqrt{18}\)  
2) \(\sqrt{68}\)  
3) \(\sqrt{60}\)

4) \(\sqrt{75}\)  
5) \(\sqrt{162}\)  
6) \(\sqrt{12}\)

7) \(\sqrt{125}\)  
8) \(\sqrt{300}\)  
9) \(\sqrt{128}\)

10) \(\sqrt{32}\)  
11) \(\sqrt{216}\)  
12) \(\sqrt{124}\)

13) \(2\sqrt{108}\)  
14) \(3\sqrt{20}\)  
15) \(\sqrt{40}\)

16) \(\sqrt{99}\)  
17) \(\sqrt{275}\)  
18) \(\sqrt{420}\)

19) \(\sqrt{640}\)  
20) \(-4\sqrt{28}\)  
21) \(-11\sqrt{242}\)

22) \(\sqrt{150}\)  
23) \(2\sqrt{121}\)  
24) \(-5\sqrt{18}\)

25) \(3\sqrt{175}\)  
26) \(4\sqrt{48}\)  
27) \(4\sqrt{250}\)

28) \(2\sqrt{500}\)  
29) \(\sqrt{1,000,000}\)  
30) \(3\sqrt{28}\)

31) \(4\sqrt{80}\)  
32) \(-3\sqrt{54}\)  
33) \(-8\sqrt{121}\)

Simplify the following radicals. Leave answer in radical form.

34) \(\sqrt{5} \cdot \sqrt{10}\)  
35) \(\sqrt{5} \cdot \sqrt{60}\)  
36) \(3\sqrt{5} \cdot \sqrt{5}\)

37) \(4\sqrt{10} \cdot 3\sqrt{6}\)  
38) \(\sqrt{6} \cdot 4\sqrt{24}\)  
39) \(5\sqrt{10} \cdot 3\sqrt{10}\)

40) \(7\sqrt{30} \cdot 2\sqrt{6}\)  
41) \(\sqrt{72} \cdot \sqrt{48}\)  
42) \(11\sqrt{14} \cdot 2\sqrt{7}\)

43) \(\sqrt{3} \cdot 3\sqrt{6}\)  
44) \(\sqrt{10} \cdot \sqrt{20}\)  
45) \(\sqrt{7} \cdot \sqrt{21}\)

46) \(6\sqrt{2} \cdot \sqrt{45}\)  
47) \(5\sqrt{60} \cdot 2\sqrt{30}\)  
48) \(2\sqrt{3} \cdot \sqrt{33}\)

49) \(\sqrt{32} \cdot \sqrt{12}\)  
50) \(\sqrt{5} \cdot \sqrt{8}\)  
51) \(5\sqrt{6} \cdot 2\sqrt{3}\)

52) \(\sqrt{3} \cdot \sqrt{30}\)  
53) \(3\sqrt{6} \cdot 6\sqrt{6}\)  
54) \(\sqrt{6} \cdot \sqrt{14}\)

55) \(2\sqrt{18} \cdot 6\sqrt{3}\)  
56) \(5\sqrt{2} \cdot 4\sqrt{12}\)  
57) \(-7\sqrt{3} \cdot 2\sqrt{10}\)
Simplify the following radicals. Leave no square root in the denominator, simplify all radical and numbers.

1) \( \frac{4}{\sqrt{5}} \)  
2) \( \frac{5}{\sqrt{3}} \)  
3) \( \frac{\sqrt{16}}{\sqrt{3}} \)

4) \( \sqrt{\frac{15}{5}} \)  
5) \( \frac{2}{\sqrt{7}} \)  
6) \( \frac{\sqrt{7}}{\sqrt{3}} \)

7) \( \sqrt{\frac{5}{10}} \)  
8) \( \frac{\sqrt{18}}{\sqrt{10}} \)  
9) \( \frac{\sqrt{42}}{\sqrt{7}} \)

10) \( \frac{\sqrt{169}}{\sqrt{11}} \)  
11) \( \frac{\sqrt{14}}{\sqrt{2}} \)  
12) \( \frac{\sqrt{11}}{\sqrt{32}} \)

13) \( \sqrt{\frac{9}{18}} \)  
14) \( \frac{\sqrt{30}}{\sqrt{6}} \)  
15) \( \frac{\sqrt{8}}{\sqrt{20}} \)

16) \( \sqrt{\frac{3}{2\sqrt{6}}} \)  
17) \( \frac{\sqrt{6}}{\sqrt{2}} \)  
18) \( \frac{\sqrt{2}}{\sqrt{15}} \)

19) \( \frac{9}{2\sqrt{45}} \)  
20) \( \frac{\sqrt{18}}{\sqrt{10}} \)  
21) \( \frac{4\sqrt{10}}{\sqrt{6}} \)

22) \( \sqrt{\frac{36}{49}} \)  
23) \( \frac{1}{\sqrt{4}} \)  
24) \( \frac{5}{\sqrt{36}} \)

25) \( \left( \frac{3}{4} \right)^{\frac{2}{3}} \)  
26) \( \frac{1}{\sqrt{3}} \)  
27) \( \frac{\sqrt{6}}{\sqrt{3}} \)

28) \( \frac{\sqrt{7}}{\sqrt{36}} \)  
29) \( \frac{3\sqrt{27}}{\sqrt{2}} \)  
30) \( \frac{\sqrt{7}}{\sqrt{3}} \)

31) \( \frac{\sqrt{27}}{\sqrt{14}} \)  
32) \( \frac{5}{\sqrt{8}} \)  
33) \( \frac{\sqrt{7}}{\sqrt{6}} \)

34) \( \frac{\sqrt{8}}{\sqrt{60}} \)  
35) \( \frac{3\sqrt{51}}{\sqrt{17}} \)  
36) \( \frac{2\sqrt{5}}{\sqrt{75}} \)

37) \( \frac{8}{\sqrt{27}} \)  
38) \( \frac{\sqrt{64}}{\sqrt{18}} \)  
39) \( \frac{\sqrt{3}}{\sqrt{25}} \)

40) \( \frac{\sqrt{18}}{\sqrt{36}} \)  
41) \( \frac{\sqrt{1}}{\sqrt{3}} \)  
42) \( \frac{\sqrt{20}}{\sqrt{49}} \)
# Triangles of Squares

Make all the possible different size triangles you can out of 2, 3, 4, and 5 cm squares. Record the dimensions and complete the chart.

<table>
<thead>
<tr>
<th>Length of Sides</th>
<th>Squares on Sides</th>
<th>Type of Triangle</th>
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<tr>
<td>Shortest Side $a$</td>
<td>Mid-length Side $b$</td>
<td>Longest Side $c$</td>
</tr>
<tr>
<td>$&lt;$</td>
<td>$&gt;$</td>
<td>$=$</td>
</tr>
<tr>
<td></td>
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Plot a point for each triangle so it records the area of sum of the squares on the two smaller sides and the area of the square on the longest side.

a. What type of triangles get plotted above the gray line?

b. What type of triangles get plotted on the gray line?

c. What type of triangles get plotted below the gray line?
Worksheet 10.1

Find the length of the hypotenuse, leave answer in simplest radical form.

1) \[ \begin{align*} &15 \quad x \quad 10 \end{align*} \]

Find the unknown leg length, leave answer in simplest radical form.

3) \[ \begin{align*} &18 \quad x \quad 25 \end{align*} \]

4) \[ \begin{align*} &42 \quad x \quad 36 \end{align*} \]

Find the area of the isosceles triangle in simplest radical form.

5) \[ \begin{align*} &10 \text{ in.} \quad h \quad 10 \text{ in.} \quad 14 \text{ in.} \end{align*} \]

6) \[ \begin{align*} &44 \text{ m} \quad h \quad 44 \text{ m} \quad 48 \text{ m} \end{align*} \]

The given lengths are two sides of a right triangle. All three side lengths of the triangle are integers and together form a Pythagorean triple. Find the length of the third side and tell whether it is a leg or the hypotenuse.

7) 24 and 32  
8) 24 and 45  
9) 40 and 85  
10) 49 and 168  
11) 72 and 78

Find the area of the right triangle. Write your answer in simplest radical form.

12) \[ \begin{align*} &10 \text{ in.} \quad 7 \text{ in.} \quad x \end{align*} \]

13) \[ \begin{align*} &28 \text{ m} \quad 12 \text{ m} \quad x \end{align*} \]

14) \[ \begin{align*} &52 \text{ ft} \quad 44 \text{ ft} \quad x \end{align*} \]

15) A shipping dock has a mobile ramp that is used to help load and unload cargo from trucks. The ram is 125 inches long and has a base that is 120 inches long. What is the height h or the ramp?

Challenge, Find the value of x for each

16) \[ \begin{align*} &x \quad 8 \end{align*} \]

17) \[ \begin{align*} &14 \quad x \quad 12 \quad 6 \end{align*} \]

18) \[ \begin{align*} &32 \quad x \quad 14 \quad 6 \quad 16 \quad 24 \end{align*} \]
10.1 Part 2 Converse of Pythagorean Theorem

Do Work on own sheet of paper.

Tell whether the triangle is a right triangle. If not a right triangle, then what kind?

1) 25 16
   20

2) 15
   17
   8

3) 16
   21
   24

Decide whether the numbers can represent the side lengths of a triangle. If they can, classify the triangle as acute, right, or obtuse.

4) 6, 8, 10
5) 5, 7, 9
6) 8, 9, 10
7) 10, 12, 30
8) 16, 30, 34
9) 18, 34, 45
10) \(\sqrt{85}, 4, 6\)
11) 20, 21, 28
12) \(\sqrt{13}, 10, 12\)
13) 14, 48, 50

Graph points A, B, and C. Connect the points to form \(\triangle ABC\). Decide whether \(\triangle ABC\) is right, acute, or obtuse.

14) \(A(-3, 5), B(0, -2), C(4, 1)\)

15) \(A(-8, -4), B(-5, -2), C(-1, -7)\)

16) \(A(0, 5), B(3, 6), C(5, 1)\)

17) \(A(-2, 4), B(2, 0), C(5, 2)\)

The sides and classification of a triangle are given below. The length of the longest side is the integer given. What value(s) of \(x\) make the triangle?

20) \(x, x, 8\); right
21) \(x, x, 12\); obtuse
22) \(x, x, 6\); acute
23) \(x, x, 16\); right
24) \(x, x, 10\); obtuse
25) \(x, x, 15\); acute

Maps The distances between three towns are given in the diagram.

26) Is the triangle \(\triangle ABC\) formed by the three towns a right triangle?

27) Town B is directly west of town C. Is town A directly north of town C?
Worksheet 1 Altitude to the Hypotenuse

Name _____________________

1) If an altitude is drawn to the hypotenuse of triangle BAN below, then name and redraw the 3 similar triangles created.

Find the missing value “x” below:

2)

Find the geometric mean of the following numbers.

7) 5 and 8
8) 7 and 11
9) 4 and 9
10) 2 and 25
11) 6 and 8
12) 8 and 32
For 7-9 find the length of each leg of right triangle GHK. (find GH and HK)

13) \[
\begin{array}{c}
G \\
\quad H \\
\quad K \\
5 \\
15
\end{array}
\]

14) \[
\begin{array}{c}
G \\
\quad K \\
\quad H \\
3 \\
9
\end{array}
\]

15) How far is it across the lake?

\[
\text{Lake}
\]

\[
\begin{array}{c}
4 \text{ km} \\
6 \text{ km}
\end{array}
\]

Solve for the variable(s)

2) \[
\begin{array}{c}
\text{6} \\
\quad 4
\end{array}
\]

3) \[
\begin{array}{c}
25 \\
20 \\
x
\end{array}
\]

4) \[
\begin{array}{c}
x \\
\quad 32 \\
\quad 4
\end{array}
\]

5) \[
\begin{array}{c}
12 \\
2 \\
x
\end{array}
\]

6) \[
\begin{array}{c}
5 \\
\quad x \\
x + 2
\end{array}
\]

7) \[
\begin{array}{c}
x \\
\quad y \\
24
\end{array}
\]

Find the geometric mean for the following numbers.

8) 32 and 2
9) 6 and 8
10) 6 and 7

11) 10 and 6
12) 3 and 50
13) 16 and 25
14) The altitude, \( \overline{XR} \), to the hypotenuse of right \( \triangle WXY \) divides the hypotenuse into segments that are 8 and 10 cm long. Find the length of the altitude.

15) How far is it across the quicksand?

16) The altitude of a right triangle divides the hypotenuse into two segments whose lengths are 9 cm and 16 cm. Find the lengths of the two legs.

17) Find the lengths of GH and HK.
Find the value of the missing sides. Leave in rationalized and simplified form.

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

Name ________________________________  
Period __________

Page 10
33) The sides of a square are 12 inches long. What is the length of the diagonal?

34) An isosceles right triangle has a hypotenuse of $8\sqrt{2}$ cm. What is the length of the legs of the triangle?

35) A square has a diagonal with the length of $8\sqrt{5}$ meters. What is the length of the sides?

36) An isosceles right triangles legs are $10\sqrt{8}$ feet long. What is the length of the hypotenuse?
Find the measure of the missing 2 sides for each figure below. Leave answer in rationalized and simplified form.

1)  
2)  
3)  
4)  
5)  
6)  
7)  
8)  
9)  
10)  
11)  
12)  
13)  
14)  
15)  
16)  
17)  
18)  

Name ________________________________  
Period _________
25) An equilateral triangle sides are 10 inches. What is the length of the altitude?

26) An equilateral triangle has an altitude of 6 cm. What is the length of the sides?

27) In a 30° – 60° – 90° triangle, the shortest leg is 6, what is the length of the longest leg and the hypotenuse?

28) In a 30° – 60° – 90° triangle, the longest leg is $4\sqrt{3}$, what is the length of the shortest leg and the hypotenuse?

29) In a 30° – 60° – 90° triangle, the hypotenuse is $6\sqrt{3}$, what is the length of the legs of the triangle?

Find the measure of the missing 2 sides for each figure below. Leave answer in rationalized and simplified form.

1) [Diagram]

2) [Diagram]

3) [Diagram]

4) [Diagram]

5) [Diagram]

6) [Diagram]

7) [Diagram]

8) [Diagram]

9) [Diagram]
10) Draw a picture for each of the following leave answers in rationalized and simplified form.

19) In an equilateral triangle, the sides are $14\sqrt{7}$. Find the length of the altitude.

20) In an equilateral triangle, the altitude is $4\sqrt{5}$. Find the length of the sides.

21) In an equilateral triangle, the altitude is $\sqrt{7}$. Find the length of the sides.

22) In an equilateral triangle, the sides are $6\sqrt{10}$. Find the length of the altitude.

23) In a 30-60-90 triangle, the hypotenuse is $15\sqrt{3}$. Find the length of the longest leg.

24) In a 30-60-90 triangle, the shortest leg is $4\sqrt{21}$. Find the length of the longest leg.
Very Special Special Right Triangles Practice

Find the value of the variables for each special right triangle

1) $b + 2$
   \[30^\circ\]
   \[3a\]
   \[b + 2\]
   \[6\]

2) $4d$
   \[12\]
   \[e\sqrt{3}\]
   \[4d\]
   \[e\sqrt{3}\]

3) $f\sqrt{2}$
   \[60^\circ\]
   \[6\]
   \[e - 3\]
   \[f\sqrt{2}\]

4) $4\sqrt{3}$
   \[2h\sqrt{3}\]
   \[2g\sqrt{3}\]
   \[4\sqrt{3}\]
   \[2h\sqrt{3}\]

5) $3k$
   \[4j\]
   \[60^\circ\]
   \[12\sqrt{6}\]
   \[3k\]

6) $4\sqrt{10}$
   \[2n + 3\]
   \[4m - 2\]
   \[4\sqrt{10}\]
   \[2n + 3\]

7) $p - 3$
   \[4q\]
   \[30^\circ\]
   \[5\sqrt{6}\]
   \[p - 3\]

8) $12\sqrt{14}$
   \[3r\]
   \[s + 2\]
   \[12\sqrt{14}\]
   \[3r\]

9) $u\sqrt{6}$
   \[30^\circ\]
   \[8\]
   \[t\sqrt{3}\]

10) $x\sqrt{6}$
    \[3\sqrt{5}\]
    \[w\sqrt{10}\]
    \[x\sqrt{6}\]
    \[3\sqrt{5}\]
    \[w\sqrt{10}\]
Choose the best method, and then solve for the indicated values. Leave answers in simplified radical form.

1. \( m = \) 
2. \( n = \)

3. \( t = \)
4. \( c = \)

5. \( AX = \) 

6. \( x = \)

7. \( y = \)
8. \( x = \)

9. \( x = \)
10. \( x = \)

11. \( w = \)
12. \( x = \)
13. A square has a diagonal of length 8 cm. Find the length of each side. 

14. An equilateral triangle has sides of length 14 cm. Find the length of the altitude

15. Find the value of x.

16. Find the value of x.

17. Find the value of x.

18. Find the value of x.

19. Find the value of x, y and z.

20. Find the missing side lengths of hexagon RSTUVW. Find the perimeter.

Find the missing lengths for each triangle below.

1) 

2) 

3) 

4) 

5) 

6)
22) This toy is a series of isosceles right triangles. If $AB = 2$, find $AC, BC, CD, CF, BD, DE, EF,$ and $DF$. 

23) The isosceles right triangles are labeled as follows: 

- $ABC$ 
- $CDE$ 
- $EFA$ 
- $ABD$ 
- $DEF$ 
- $EAB$ 

24) Solve for the following:

- $AC = \sqrt{2}$
- $BC = \sqrt{2}$
- $CD = \sqrt{2}$
- $CF = \sqrt{2}$
- $BD = \sqrt{2}$
- $DE = \sqrt{2}$
- $EF = \sqrt{2}$
- $DF = \sqrt{2}$

25) The lengths of the sides are as follows:

- $AC = \sqrt{2}$
- $BC = \sqrt{2}$
- $CD = \sqrt{2}$
- $CF = \sqrt{2}$
- $BD = \sqrt{2}$
- $DE = \sqrt{2}$
- $EF = \sqrt{2}$
- $DF = \sqrt{2}$
23) An extension ladder forming a $60^\circ$ angle with the ground is placed against an outside wall. The top of the ladder touches a window sill that is 12 feet high. To what length is the ladder extended? How far from the wall is the bottom of the ladder? Give answers in radical form and decimal to nearest tenth.

Use the picture of the ski lift for 24-26

24) A ski lift is shown at the right. Find the distance from the bottom of the lift to the top of the lift.

25) In the ski lift, find the length of the shortest cable that could be used. Assume that there is no length around the pulleys.

26) In the ski lift, the actual length of the cable is 10,120 feet. About how much slack is in the cable?

Review Special Right Triangles

Name ________________________________

Period _________

1. What is the ratio of all $30$-$60$-$90$ triangles?

2. What is the ratio of all $45$-$45$-$90$ triangles?

Find the missing sides for each of the following. Leave answer in simplified and rationalized.

3. 

4. 

5. 

6. 

7. 

8.
9. \[ \sqrt{3} \]

10. \[ 36 \]

11. \[ 6 \]

12. \[ 17 \]

13. \[ 38\sqrt{2} \]

14. \[ 15 \]

15. \[ 24 \]

16. \[ 12 \]

17. \[ 6\sqrt{2} \]

18. Find the length of the diagonal of a square with a side of length \( 13\sqrt{2} \).

19. Find the length of a side of a square with a diagonal length of 100.

20. The length of a side of an equilateral triangle is 12. Find the length of the altitude.

21. The length of the altitude of an equilateral triangle is 9. Find the length of a side.

22. At a point 500 miles north of a ship, the shoreline runs east and west. West of that point, the navigator sights a light house at an angle of \( 60^\circ \). How far is the ship from the lighthouse?

23. A point on the edge of a symmetrical canyon is 4500 ft above a river that cuts through The canyon floor. The angle of depression from each side of the canyon to the canyon floor is \( 60^\circ \).

Find the length of the canyon wall (from the edge to the river).
Use Pythagorean Theorem on the following triangles.

24. \[
\begin{array}{c}
10\\
8
\end{array} x
\]

25. \[
\begin{array}{c}
6\\
8
\end{array} x
\]

26. \[
\begin{array}{c}
12\\
8
\end{array} x
\]

Decide if the segment lengths form a triangle. If so, would the triangle be acute, right, or obtuse?

27. 14, 21, and 25  
28. 11, 19, and 32  
29. 3, 9, and \(3\sqrt{11}\)  
30. \(4\sqrt{21}\), 25, and 31

31. A ladder leaning against a wall makes a 60° angle with the ground. The base of the ladder is 3 m from the building. How high above the ground is the top of the ladder?

32. The roof of a house is the shape of an isosceles right triangle. The slope of the roof is 24 feet, what is the height of the roof?

Find the geometric mean of the following numbers.

33. 12 and 6  
34. 8 and 6  
35. 10 and 12  
36. 5 and 30

Use the special properties of an altitude to the hypotenuse to answer the following questions. **Pick 3 problems and find the area of the triangle.**

37. Find \(x\)

38. Find \(x\)

39. Find \(x\)

40. Find \(x\)

41. Find \(x\)

42. Find \(x\)

43. Find \(x\)

44. Find \(x\) and \(y\)

45. Find \(x\) and \(y\)
The following picture is made up of $45^\circ - 45^\circ - 90^\circ$ and $30^\circ - 60^\circ - 90^\circ$ special right triangles. Look carefully at each to determine which type of triangle they are. The sum of the squares of the variables is the year that China’s Ming Dynasty began. What year was it?

Answers:

$\begin{align*}
a &= \_\_\_ \\
b &= \_\_\_ \\
c &= \_\_\_ \\
d &= \_\_\_ \\
e &= \_\_\_ \\
f &= \_\_\_ \\
g &= \_\_\_ \\
h &= \_\_\_ \\
i &= \_\_\_ \\
j &= \_\_\_
\end{align*}$

Work:

$\begin{align*}
a^2 &= \_\_\_ \\
b^2 &= \_\_\_ \\
c^2 &= \_\_\_ \\
d^2 &= \_\_\_ \\
e^2 &= \_\_\_ \\
f^2 &= \_\_\_ \\
g^2 &= \_\_\_ \\
h^2 &= \_\_\_ \\
i^2 &= \_\_\_ \\
j^2 &= \_\_\_
\end{align*}$

Sum:

Due Date _________________ Answer: _________________