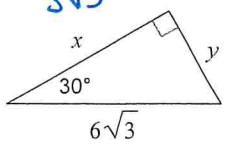
Geometry Honors Name KEY

Focus - Section 5.8 Special Right Triangles

Date _____ Period ____

Find the missing side lengths. Leave your answers as radicals in simplest form.

1) 

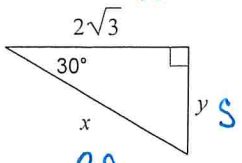
$2s = 6\sqrt{3}$

$\frac{2s}{2} = \frac{6\sqrt{3}}{2}$

$s = 3\sqrt{3}$

$y = 3\sqrt{3}$

$x = 3\sqrt{3} \cdot \sqrt{3} = 9$

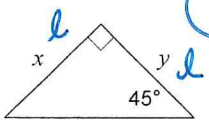
2) 

$2\sqrt{3} = s\sqrt{3}$

$s = 2$

$x = 2(2) = 4$

$y = 2$

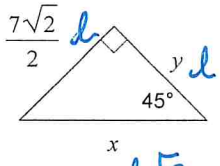
3) 

$\frac{6}{\sqrt{2}} = \frac{l\sqrt{2}}{\sqrt{2}}$

$l = \frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = 3\sqrt{2}$

$x = 3\sqrt{2}$

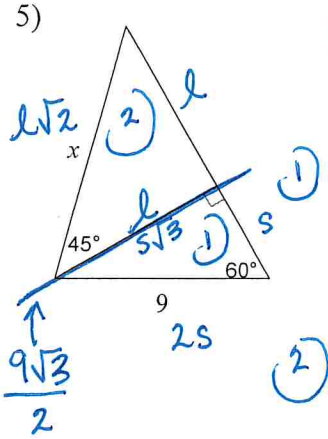
$y = 3\sqrt{2}$

4) 

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

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

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

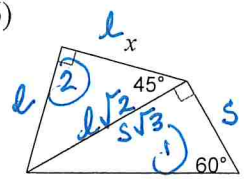
5) 

(1) $2s = 9$

$s = \frac{9}{2}$

(2) $l = \frac{9\sqrt{3}}{2}$

$x = \frac{9\sqrt{3}}{2} \cdot \sqrt{2} = \frac{9\sqrt{6}}{2}$

6) 

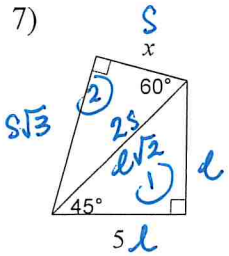
(1) $2s = 9$

$s = \frac{9}{2}$

(2) $\frac{l\sqrt{2}}{\sqrt{2}} = \frac{\frac{9}{2}\sqrt{3}}{\sqrt{2}}$

$l = \frac{9\sqrt{3}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$l = \frac{9\sqrt{6}}{4} = x$

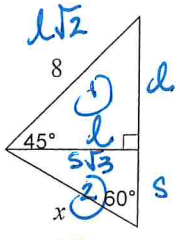
7) 

(1) $l = 5$

(2) $\frac{2s}{2} = \frac{5\sqrt{2}}{2}$

$s = \frac{5\sqrt{2}}{2}$

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

8) 

(1) $\frac{8}{\sqrt{2}} = \frac{l\sqrt{2}}{\sqrt{2}}$

$l = \frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

(2) $\frac{4\sqrt{2}}{\sqrt{3}} = \frac{s\sqrt{3}}{\sqrt{3}}$

$s = \frac{4\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{6}}{3}$

$x = 2 \cdot \frac{4\sqrt{6}}{3}$

$x = \frac{8\sqrt{6}}{3}$

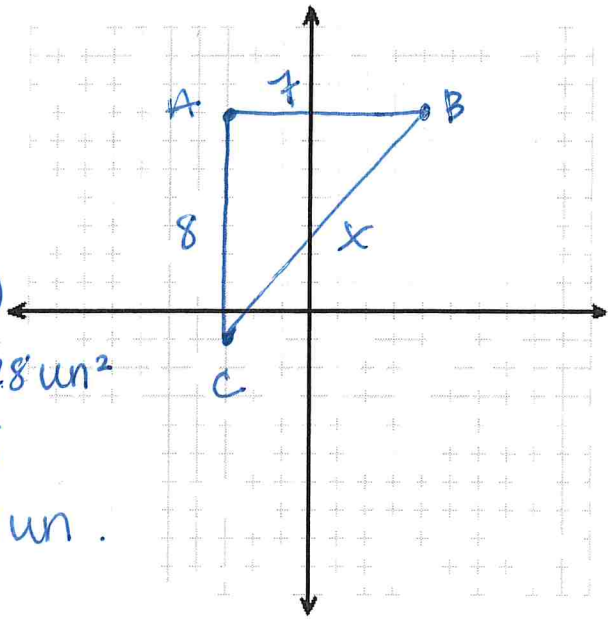
Geometry Honors
Assignment 5.5 to 5.7

Name: KEY
Period:

1) Given vertices A(-3, 7) B(4, 7) C (-3, -1)

Find the perimeter and area.

P = $(15+\sqrt{113})$ un. A = 28 un²



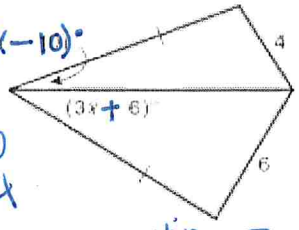
$8^2+7^2=x^2$
$64+49=x^2$
$113=x^2$
$x=\sqrt{113}$

$A=\frac{1}{2}(8)(7))$
$A=\frac{1}{2}(56)=28\ un^2$
$P=8+7+\sqrt{113}$
$P=(15+\sqrt{113})\ un.$

★Warm up★

Find the range of values for x.

3.



1) $x-10>0$
$x>10$

2) $3x+6>0$
$3x>-6$
$x>-2$

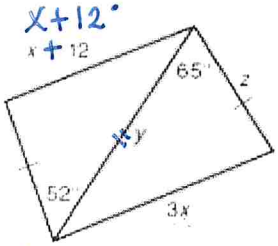
Hinge Thm

3) $x-10<3x+6$
$-10<2x+6$
$-16<2x$
$-8<x$
$x>-8$

4)
$3x+6<180$
$3x<174$
$x<58$
$x-10<180$
$x<190$

$10<x<58$

4.



1) $x+12<3x$ Hinge Thm
$12<2x$
$6<x$
$x>6$

2) $x+12>0$
$x>-12$

3) $3x>0$
$x>0$

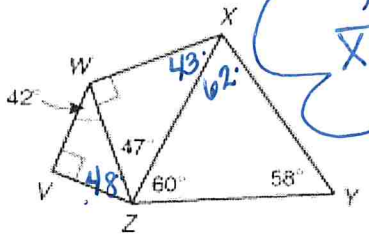
Triangle Inequality Thm

4) $y+z>3x$
$x<\frac{1}{3}(y+z)$

$6<x<\frac{1}{3}(y+z)$

List the segments in order from smallest to largest in #5.

5.



$\overline{VZ}, \overline{VW}, \overline{WZ}, \overline{WX}, \overline{XZ}, \overline{XY}, \overline{YZ}$

#6 Tell whether the following values would form a triangle:

14, 16, 8
$8+16>14$
$14+16>8$ ✓
$8+14>16$

$3x+2, x^2, 2x$ when $x=4$ yes

$3x+2, x^2, 2x$ when $x=6$ no

20, 36, 12
$20+36>12$
$12+36>20$
$12+20>36$ ×

State if the three numbers can be the measures of the sides of a triangle.

1) 20, 6, 12 $6+12 \not> 20$ no

2) 12, 11, 7 yes

3) 18, 7, 12 yes

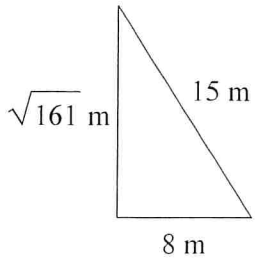
4) 3, 9, 6 no $3+6 \not> 9$

5) 10, 6, 3 $3+6 \not> 10$ no

6) 10, 11, 20 yes

State if each triangle is acute, obtuse, or right.

7)



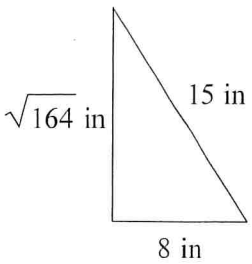
$8^2+(\sqrt{161})^2 \_\_ 15^2$

$64+161 \_\_ 225$

$225 = 225$

Right

8)



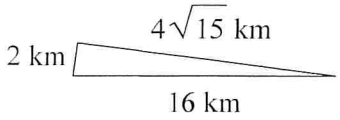
$(\sqrt{164})^2+8^2 \_\_ 15^2$

$164+64 \_\_ 225$

$228 > 225$

Acute

9)



$(2)^2+(4\sqrt{15})^2 \_\_ 16^2$

$4+(16)(15) \_\_ 256$

$244 < 256$

Obtuse

3
16
15
80
16
240

Two sides of a triangle have the following measures. Find the range of possible measures for the third side.

10) 11, 7, x $4 < x < 18$

$11+x > 7 \quad x > -4$

$11+7 > x \quad x < 18$

$x+7 > 11 \quad x > 4$

11) 12, 12, x $0 < x < 24$

$12+12 > x \quad x < 24$

$12+x > 12 \quad x > 0$

12) 6, 9, x $3 < x < 15$

$6+9 > x \quad 15 > x$

$6+x > 9 \quad x > 3$

$9+x > 6 \quad x > -3$

13) 10, 8, x $2 < x < 18$

$10+x > 8 \quad x > -2$

$8+x > 10 \quad x > 2$

$10+8 > x \quad 18 > x$

14) 10, 11, x $1 < x < 21$

$10+11 > x \quad 21 > x$

$10+x > 11 \quad x > 1$

$11+x > 10 \quad x > -1$

15) 8, 6, x $2 < x < 14$

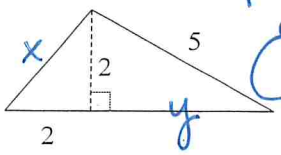
$8+6 > x \quad 14 > x$

$8+x > 6 \quad x > -2$

$6+x > 8 \quad x > 2$

Find the area of each triangle. ~~**Round your final answer to 2 places.**~~ Simplest Radical

16)



$2^2 + 2^2 = x^2$

$8 = x^2$

$x = 2\sqrt{2}$

$2^2 + y^2 = 5^2$

$4 + y^2 = 25$

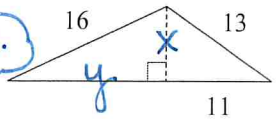
$y^2 = 21$

$y = \sqrt{21}$

$A = \frac{1}{2}(2 + \sqrt{21})(2)$

$A = \frac{1}{2}(4 + 2\sqrt{21}) = (2 + \sqrt{21})$ un.^{2}

17)



$11^2 + x^2 = 13^2$

$121 + x^2 = 169$

$x^2 = 48$

$x = 4\sqrt{3}$

$(4\sqrt{3})^2 + y^2 = 16^2$

$48 + y^2 = 256$

$y^2 = 208$

$y = \sqrt{208}$

$y = 4\sqrt{13}$

$P = 16 + 13 + 11 + 4\sqrt{13}$

$P = (40 + 4\sqrt{13})$ un

$A = \frac{1}{2}(11 + 4\sqrt{13})(4\sqrt{3})$

$A = \frac{1}{2}(44\sqrt{3} + 16\sqrt{39})$

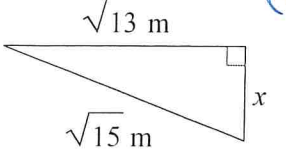
$A = (22\sqrt{3} + 8\sqrt{39})$ un^2

$P = 2\sqrt{2} + 5 + \sqrt{21} + 2$

$P = (7 + 2\sqrt{2} + \sqrt{21})$ un.

Find the missing side of each triangle. Leave your answers in simplest radical form.

18)



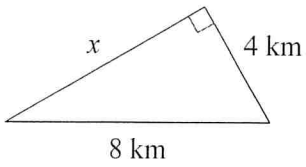
$(\sqrt{13})^2 + x^2 = (\sqrt{15})^2$

$13 + x^2 = 15$

$x^2 = 2$

$x = \sqrt{2}$ m

19)



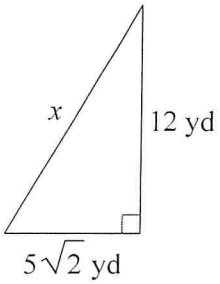
$x^2 + 4^2 = 8^2$

$x^2 + 16 = 64$

$x^2 = 48$

$x = 4\sqrt{3}$ km

20)



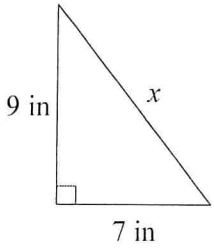
$12^2 + (5\sqrt{2})^2 = x^2$

$144 + 50 = x^2$

$194 = x^2$

$x = \sqrt{194}$ yd

21)



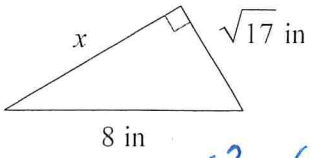
$9^2 + 7^2 = x^2$

$81 + 49 = x^2$

$130 = x^2$

$x = \sqrt{130}$ in

22)



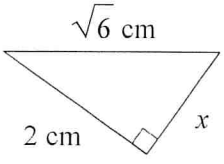
$x^2 + (\sqrt{17})^2 = 8^2$

$x^2 + 17 = 64$

$x^2 = 47$

$x = \sqrt{47}$

23)



$2^2 + x^2 = (\sqrt{6})^2$

$4 + x^2 = 6$

$x^2 = 2$

$x = \sqrt{2}$ cm

Answers to

1) No
2) Yes
3) Yes
4) No
5) No
6) Yes
7) Right
8) Acute
9) Obtuse
10) $4 < x < 18$
11) $0 < x < 24$
12) $3 < x < 15$
13) $2 < x < 18$
14) $1 < x < 21$
15) $2 < x < 14$
16) 6.6
17) 87.6
18) $\sqrt{2}$ m
19) $4\sqrt{3}$ km
20) $\sqrt{194}$ yd
21) $\sqrt{130}$ in
22) $\sqrt{47}$ in
23) $\sqrt{2}$ cm

Name KEY Date Class

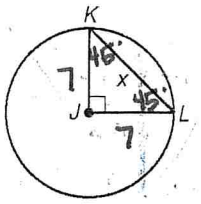
LESSON 5-8

Challenge

Applying Properties of Special Right Triangles

Use the properties of special right triangles to solve each problem. Give your answers in simplest radical form.

1. The circumference of circle J is 14π. What is the value of x?



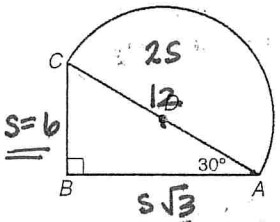
$C = 2\pi r$

$14\pi = 2\pi r$

$7 = r$

$x = 7\sqrt{2}$

2. The area of semicircle D is 18π. What is the perimeter of $\triangle ABC$?



$A = \frac{1}{2}\pi r^2$

$18\pi = \frac{1}{2}\pi r^2$

$36 = r^2$

$r = 6$

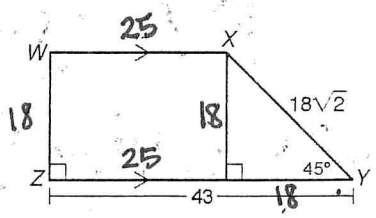
$d = 12$

$s = 6$

$P = 12 + 6 + 6\sqrt{3}$

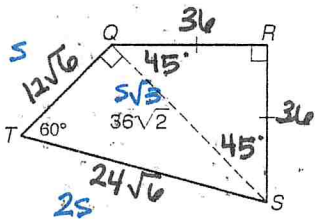
$P = 18 + 6\sqrt{3}$

3. Find the perimeter of quadrilateral $WXYZ$.



$18 + 25 + 18\sqrt{2} + 43 = 86 + 18\sqrt{2}$

4. Find the perimeter of quadrilateral $QRST$



$\frac{36\sqrt{2}}{\sqrt{3}} = \frac{s\sqrt{3}}{\sqrt{3}}$

$\frac{36\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{36\sqrt{6}}{3}$

$s = 12\sqrt{6}$

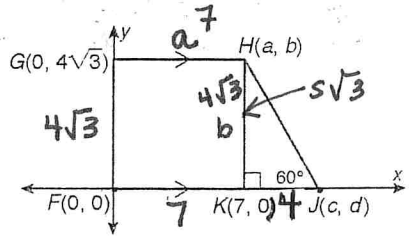
$2(12\sqrt{6})$

$24\sqrt{6}$

$P = 36 + 36 + 24\sqrt{6} + 12\sqrt{6}$

$P = 72 + 36\sqrt{6}$

5. Find a, b, c, and d.



$a = 7$ $c = 11$

$b = 4\sqrt{3}$ $d = 0$

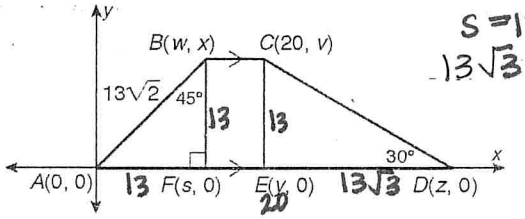
$4\sqrt{3} = s\sqrt{3}$

$s = 4$

$c - 7 = 4$

$c = 11$

6. Find w, x, y, and z.



$s = 13$

$13\sqrt{3}$

$w = 13$ $y = 20$

$x = 13$ $z = 20 + 13\sqrt{3}$

Name Skip #7 and #8 Date Class

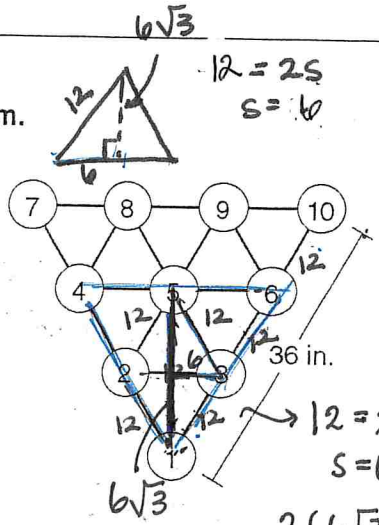
LESSON 5-8

Problem Solving

Applying Special Right Triangles

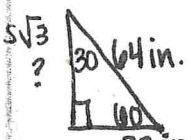
For Exercises 1–6, give your answers in simplest radical form.

1. In bowling, the pins are arranged in a pattern based on equilateral triangles. What is the distance between pins 1 and 5?



$2(6\sqrt{3}) = \boxed{12\sqrt{3} \text{ in.}}$

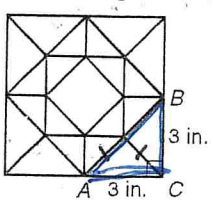
2. To secure an outdoor canopy, a 64-inch cord is extended from the top of a vertical pole to the ground. If the cord makes a 60° angle with the ground, how tall is the pole?



$\boxed{32\sqrt{3} \text{ in.}}$

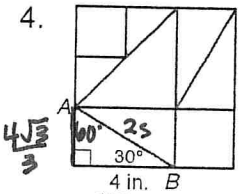
Find the length of $\overline{AB}$ in each quilt pattern.

3.



$\overline{AB} \Rightarrow 2\left(\frac{3\sqrt{2}}{2}\right) = \boxed{3\sqrt{2}}$

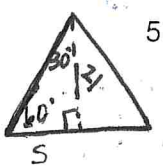
4.



$\overline{AB} \Rightarrow 2\left(\frac{4\sqrt{3}}{3}\right) = \boxed{\frac{8\sqrt{3}}{3}}$

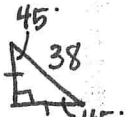
Choose the best answer.

5. An equilateral triangle has an altitude of 21 inches. What is the side length of the triangle?



Side: $2(7\sqrt{3}) = \boxed{14\sqrt{3}}$

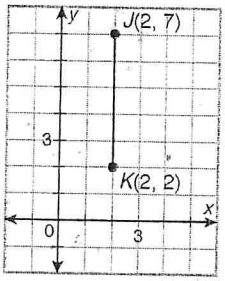
6. A shelf is an isosceles right triangle, and the longest side is 38 centimeters. What is the length of each of the other two sides?



$\boxed{19\sqrt{2}}$

Use the figure for Exercises 7 and 8.

Assume $\triangle JKL$ is in the first quadrant, with $m\angle K = 90°$.



7. Suppose that $\overline{JK}$ is a leg of $\triangle JKL$, a 45°-45°-90° triangle. What are possible coordinates of point L?

   A (6, 4.5) C (6, 2)

   (B) (7, 2) D (8, 7)

8. Suppose $\triangle JKL$ is a 30°-60°-90° triangle and $\overline{JK}$ is the side opposite the 60° angle. What are the approximate coordinates of point L?

   (F) (4.9, 2) H (8.7, 2)

   G (4.5, 2) J (7.1, 2)

$\frac{5}{\sqrt{3}} = \frac{s\sqrt{3}}{\sqrt{3}}$

$s = \frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3} \approx 2.89$

$2 + 2.89 = 4.89$

P. 365, #2-17

2. $\angle L$, $\angle K$, $\angle M$

3. $\overline{EF}$, $\overline{DE}$, $\overline{DF}$

4. $8.3 + 10.5 > 18.8$ ✗
   $8.3 + 18.8 > 10.5$ ✓
   $10.5 + 18.8 > 8.3$ ✓
   } NO!

5. $4s$, $s+10$, s^2, $s=4$
   16, 14, 16

   $16+14>16$ ✓
   $16+16>14$ ✓
   } YES!

6. 9km, 16 km, x km

   $9+16>x$ → $25>x$ → $x<25$

   $x+9>16$ → $x>7$

   ~~$x+16>4$ → $x>-7$~~

   $7<x<25$ km

7. $PR > SV$

8. $m\angle KJL < m\angle MJL$

9. $4x-13<15$ → $4x<28$ → $x<7$

   $4x-13>0$ → $4x>13$ → $x>3.25$

   $3.25<x<7$

10. $5^2+9^2=x^2$
    $25+81=x^2$
    $106=x^2$
    $x=\sqrt{106}$

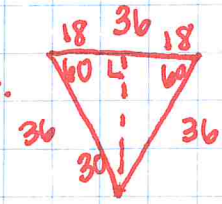
11. $11^2=9^2+x^2$
    $121=81+x^2$
    $x^2=40$
    $x=\sqrt{40}$
    $x=\sqrt{4}\cdot\sqrt{10}$
    $x=2\sqrt{10}$

12. $10+12>16$ ✓
    $10+16>12$ ✓ YES
    $12+16>10$ ✓

    $16^2 \_\_ 10^2+12^2$
    $256 \_\_ 100+144$
    $256 \Sigma 244$

    ∴ OBTUSE

13. $80^2+50^2=x^2$
    $6400+2500=x^2$
    $8900=x^2$
    $x=94.34$
    94 ft, 4 in → $0.34\cdot 12$
    4.08

14. 

    $s\sqrt{3}=h$
    $s=18$
    $h=18\sqrt{3}$
    $h\approx 31$ in

15. $l=8$, $x=8\sqrt{2}$

16. $\frac{l\sqrt{2}}{\sqrt{2}}=\frac{22}{\sqrt{2}}$ → $x=11\sqrt{2}$

    $l=\frac{22}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}=\frac{22\sqrt{2}}{2}=11\sqrt{2}$

17. $s\sqrt{3}=5\sqrt{3}$ → $s=5$
    $x=5$
    $y=2(5)=10$

#17 at the top ↑

P. 365, #1-17

2. ∠L, ∠K, ∠M

3. EF, DE, DF

4. 8.3 + 10.6 > 18.8 ✓
8.3 + 18.8 > 10.6 ✓
10.6 + 18.8 > 8.3 ✓

5. 15, 8, 10 ...
14, 15, 16

6. 9m, 11m, ...

11. $11^2 = 9^2 + x^2$
$121 = 81 + x^2$
$x^2 = 40$
$x = \sqrt{40}$
$x = 2\sqrt{10}$

12. 10, 11, 12 ...

13. $90^2 + 60^2 = x^2$
$8100 + 3600 = x^2$
$11700 = x^2$
$x = 108.2$

p. 370, #10-20

10. $\angle E, \angle B, \angle H$

11. $\overline{TY}, \overline{RY}, \overline{RT}$

12. 114 mi, 247 mi, x mi

$114+247 > x$

$361 > x$

$x < 361$

$114 + x > 247$

$x > 133$

$247 + x > 114$

$x > -133$

$133 < x < 361$ mi

13. $m\angle SPV < m\angle ZPV$

14. $4x-10 < 24$

$4x < 34$

$x < 8.5$

$4x-10 > 0$

$4x > 10$

$x > 2.5$

$2.5 < x < 8.5$

15. $21^2 + x^2 = 24^2$

$441 + x^2 = 576$

$x^2 = 135$

$x \approx 11.62$

21, 24, 11.62 not a Pythag. Triple

16. 18, 20, 27

$18+20 > 27$ ✓

$18+27 > 20$ ✓

$20+27 > 18$ ✓

YES.

$18^2 + 20^2 \_\_ 27^2$

$324 + 400 \_\_ 729$

$724 < 729$

OBTUSE

17. $62^2 + 82^2 = x^2$

$3844 + 6724 = x^2$

$10568 = x^2$

$x = 102.80$

102 ft, 10 in

18. $\frac{l\sqrt{2}}{\sqrt{2}} = \frac{20}{\sqrt{2}}$

$l = \frac{20}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{20\sqrt{2}}{2}$

$l = 10\sqrt{2}$

$x = 10\sqrt{2}$

19. $32 = 2s$

$s = 16$

$x = 16$

$y = 16\sqrt{3}$

20. $\frac{8}{\sqrt{3}} = \frac{s\sqrt{3}}{\sqrt{3}}$

$s = \frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{8\sqrt{3}}{3}$

$x = \frac{8\sqrt{3}}{3}$

$y = 2\left(\frac{8\sqrt{3}}{3}\right)$

$y = \frac{16\sqrt{3}}{3}$