Honors Geometry ***** Pretest *****

Name: Key **Chapter 9B Exam - Spring 2019**

Show All Work: Your teacher reserves the right to give no credit when work is not shown: number your problems on the workspace pages.

Simplify each of the following. Leave answers in exact, simplified, radical form. No decimals allowed.

1.) $\sqrt{711}$

2.) $\sqrt{300}$

3.) $2\sqrt{45} - 5\sqrt{20}$

4.) $\dfrac{8}{\sqrt{14}}$

5.) $\sqrt{\dfrac{5}{2}}$

6.) $\dfrac{\sqrt{15}}{\sqrt{3}}$

7.) $\sqrt{250}$

8.) $3\sqrt{27} - 8\sqrt{75}$

Use the distance formula to find the distance between the given points. Give exact answers in simplified radical form.

9.) (4, – 2), (10, 6)

10.) (17, 6), (10, – 1)

11. Use a Pythagorean triple to find the missing side of each right triangle:

a.) a = 35, b = 120, c = 125 Use: 7 - 24 - 25

b.) a = 60, b = 144, c = 156 Use: 5 - 12 - 13

c.) a = 87, b = 116, c = 145 Use: 3 - 4 - 5

Answer Column

1. $3\sqrt{79}$
2. $10\sqrt{3}$
3. $-4\sqrt{5}$
4. $\dfrac{4\sqrt{14}}{7}$
5. $\dfrac{\sqrt{10}}{4}$
6. $\sqrt{5}$
7. $5\sqrt{10}$
8. $-31\sqrt{3}$
9. 10
10. $7\sqrt{2}$
11. a = 35

b = 144

c = 145

Honors Geometry ***** **Pretest** *****

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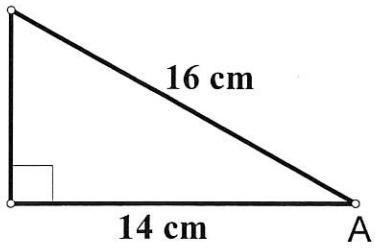
In **12 - 13**, give the side ratios for the angles requested. Answers must be in simplified fractional and/or simplified radical form.

12.)



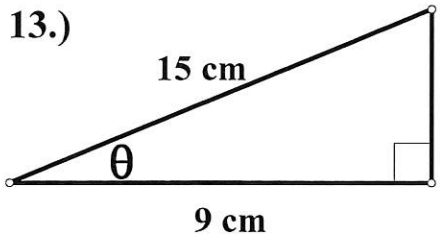
Answer Column

12. sin A = $\frac{\sqrt{15}}{8}$

cos A = $\frac{7}{8}$

tan A = $\frac{\sqrt{15}}{7}$

13.)



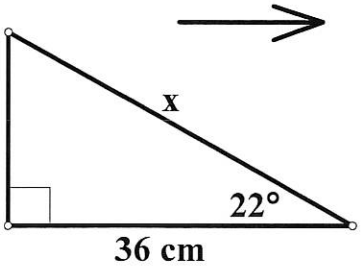
13. sin θ = $\frac{4}{5}$

cos θ = $\frac{3}{5}$

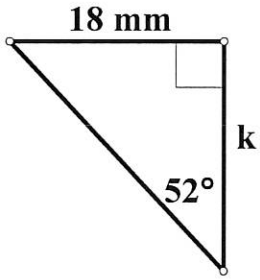
tan θ = $\frac{4}{3}$

In **14 - 17**, use a trig function or an inverse trig function to find the unknown value. Round side lengths and angle measures to the nearest **tenth.** Label all answers with the necessary units.

14.)



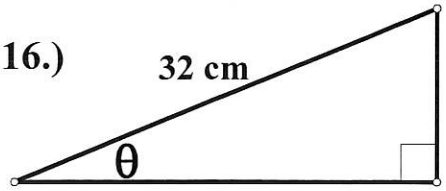
15.)



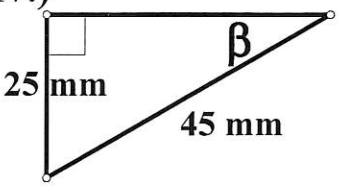
14. x = 38.8cm

15. k = 14.1 mm

16.)



17.)



16. m∠θ = 41.4°

17. m∠β = 33.7°

Honors Geometry ***** **Pretest** *****

Name: Key **Chapter 9B Exam - Spring 2019**

Answer Column

18.) An equilateral triangle has sides of length 16 cm. Find its area. **18.** $64\sqrt{3}$ cm^2

19.) What is the diagonal length of a rectangular prism having length, width, and height of 4 cm, 6 cm, and 8 cm, respectively? **19.** $2\sqrt{29}$ cm

20.) What is the slant height of a square pyramid with base perimeter of 96 mm and height of 16 mm? **20.** $\ell = 20$ mm

21. One angle of a rhombus measures 120°. If the figure's perimeter is $52\sqrt{3}$ cm, find the length of each of its diagonals. **21.** $d_1 =$ $13\sqrt{3}$ cm

$d_2 =$ 39 cm

Bonus: Chapter 9 ***** Pretest *****

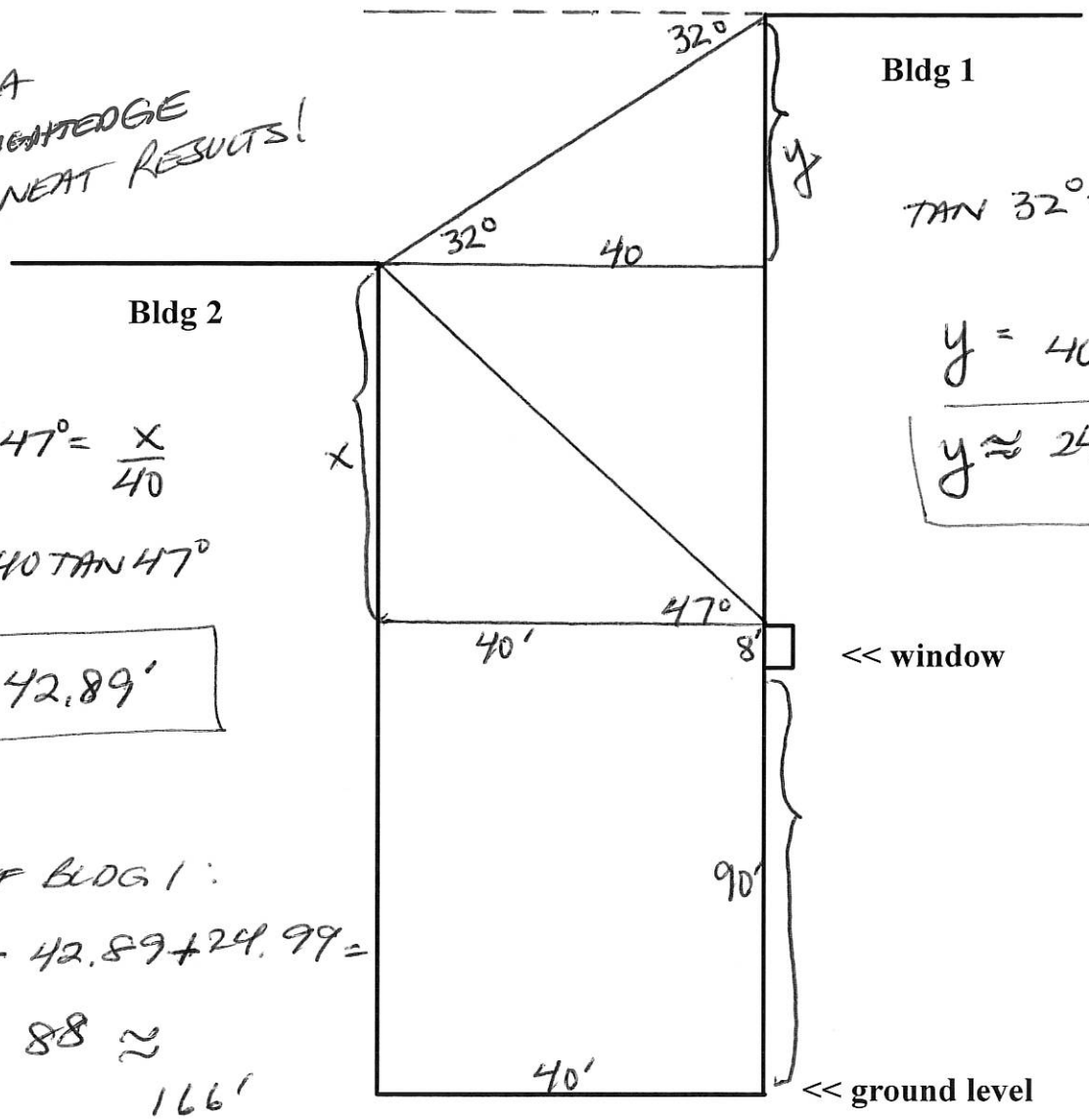
Name: KEY **Chapter 9B Exam - Spring 2019**

[5%] B1. Given the facts, find the height of Bldg 1:

All units are in feet. Building 1 and Building 2 are 40 feet part. The angle of depression from the top of Bldg 1 to the top of Bldg 2 is 32°. The bottom of the 8-foot, Bldg 1 window depicted is 90 feet from the ground, and the angle of elevation from top of this window to the top of Bldg 2 is 47°.

All work/steps required to find the answer must be shown. Round the final answer to the nearest foot.

USE A STRAIGHTEDGE FOR NEAT RESULTS!



$\tan 32° = \frac{y}{40}$

$y = 40 \tan 32°$

$\boxed{y \approx 24.99'}$

$\tan 47° = \frac{x}{40}$

$x = 40 \tan 47°$

$\boxed{x \approx 42.89'}$

HEIGHT OF BLDG 1:

$90 + 8 + 42.89 + 24.99 =$

$165.88 \approx$

$166'$

Height of Bldg 1: 166'

1.) $\sqrt{711}$ SINCE $7+1+1=9$, 711 IS DIVISIBLE BY 9 (A PERFECT SQUARE!)

$$\sqrt{711} = \sqrt{\underset{3}{9}\cdot 79} = \boxed{3\sqrt{79}}$$

5.) $$\sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{10}}{4}}$$

2.) $$\sqrt{300} = \sqrt{\underset{10}{100}\cdot 3} = \boxed{10\sqrt{3}}$$

3.) $$2\sqrt{45} - 5\sqrt{20} =$$

$$2\sqrt{\underset{3}{9}\cdot 5} - 5\sqrt{\underset{2}{4}\cdot 5}$$

$$6\sqrt{5} - 10\sqrt{5} \quad \text{("LIKE RADICALS")}$$

$$\boxed{-4\sqrt{5}}$$

4.) $$\frac{8}{\sqrt{14}}\cdot\frac{\sqrt{14}}{\sqrt{14}} = \frac{\cancel{8}\sqrt{14}}{\cancel{14}} = \boxed{\frac{4\sqrt{14}}{7}}$$

5.) (ABOVE)

6.) $$\frac{\sqrt{\cancel{15}5}}{\sqrt{\cancel{3}}} = \boxed{\sqrt{5}}$$

(WE CAN MULT. AND DIVIDE UNDER THE RADICAL, BUT WE CANNOT SPLIT APART + AND −)

7.) $$\sqrt{250} = \sqrt{\underset{5}{25}\cdot 10}$$

$$\boxed{5\sqrt{10}}$$

8.) $$3\sqrt{27} - 8\sqrt{75}$$

$$3\sqrt{\underset{3}{9}\cdot 3} - 8\sqrt{\underset{5}{25}\cdot 3}$$

$$9\sqrt{3} - 40\sqrt{3}$$

$$\boxed{-31\sqrt{3}}$$

9.) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$(4, -2), (10, 6)$

$d = \sqrt{(10-4)^2 + (6 - -2)^2}$

$d = \sqrt{6^2 + 8^2}$

$d = \sqrt{36 + 64} = \sqrt{100} = \boxed{10}$

10.) $(17, 6), (10, -1)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = \sqrt{(17-10)^2 + (6 - -1)^2}$

$d = \sqrt{7^2 + 7^2} = \sqrt{98}$

$d = \sqrt{49 \cdot 2} = \boxed{7\sqrt{2}}$

7

11a.) 7 - 24 - 25

$a = \underline{35}$, $b = 120$, $c = 125$ (TIMES 5)

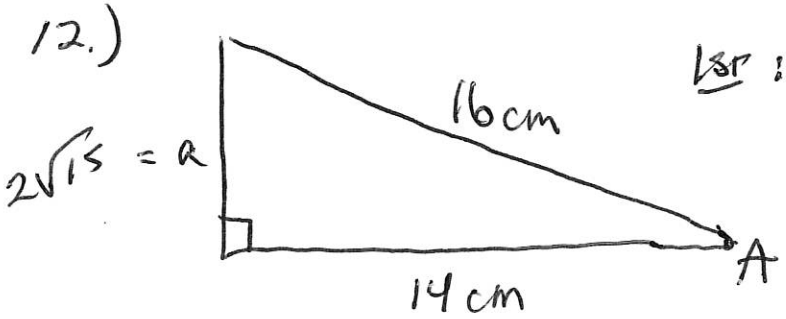
11 b.) $\begin{array}{ccc} 5 & - & 12 & - & 13 \\ \downarrow & & \downarrow & & \downarrow \end{array}$

$a = 60 \quad b = \underline{144}, \quad c = 156$ (TIMES 12)

11c.) $\begin{array}{ccc} 3 & & 4 & & 5 \\ \downarrow & & \downarrow & & \downarrow \end{array}$

$a = 87, \quad b = 116, \quad c = \underline{145}$ (MULTIPLIER = 29)

12.)



1st: USE PYTHAGORUS TO FIND THE UNKNOWN SIDE LENGTH:

$14^2 + a^2 = 16^2$

$a^2 = 16^2 - 14^2$

$a = \sqrt{256 - 196}$

$a = \sqrt{60} = \sqrt{4 \cdot 15}$

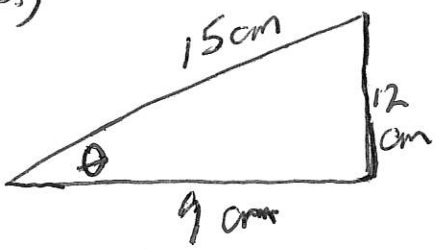
$a = 2\sqrt{15}$

$\sin A = \frac{\cancel{2}\sqrt{15}}{\cancel{16}\,8} = \boxed{\frac{\sqrt{15}}{8}}$

$\cos A = \frac{14}{16} = \boxed{\frac{7}{8}}$

$\tan A = \frac{\cancel{2}\sqrt{15}}{\cancel{14}\,7} = \boxed{\frac{\sqrt{15}}{7}}$

13.)

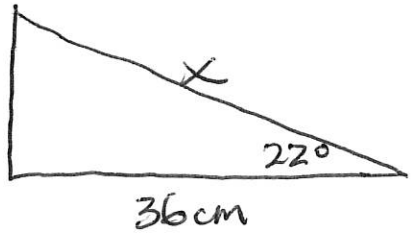


1st: USE PYTHAG. (IN THIS CASE A PYTHAG. TRIPLE!) TO FIND THE UNKNOWN SIDE LENGTH:

$\begin{array}{ccccc} 3 & - & 4 & - & 5 \\ \downarrow & & \downarrow & & \downarrow \\ 9 & - & 12 & - & 15 \end{array}$ (MULTIPLIER = 3)

$$\boxed{\begin{aligned} \sin\theta &= \frac{12}{15} = \frac{4}{5} \\ \cos\theta &= \frac{9}{15} = \frac{3}{5} \\ \tan\theta &= \frac{12}{9} = \frac{4}{3} \end{aligned}}$$

14.)

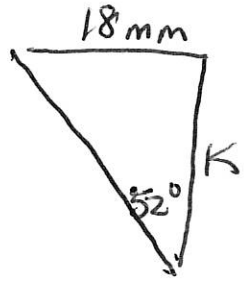


$$\frac{\cos 22^\circ}{1} = \frac{36}{x}$$

$$\frac{x \cos 22^\circ}{\cos 22^\circ} = \frac{36}{\cos 22^\circ}$$

$$\boxed{x \approx 38.8\text{cm}}$$

15.)

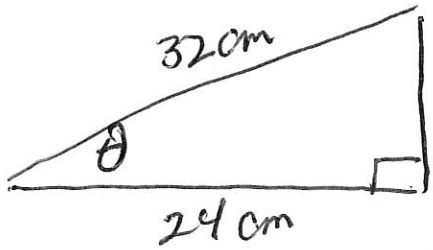


$$\frac{\tan 52^\circ}{1} = \frac{18}{K}$$

$$\frac{K \tan 52^\circ}{\tan 52^\circ} = \frac{18}{\tan 52^\circ}$$

$$K = \frac{18}{\tan 52^\circ} \approx 14.1\text{ mm}$$

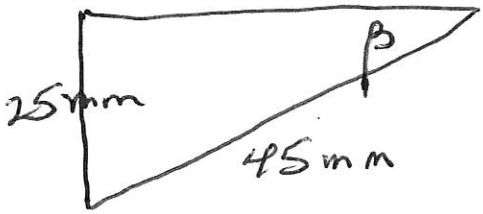
16.)



$$\cos\theta = \frac{24}{32}$$

$$m\angle\theta = \cos^{-1}\left(\frac{24}{32}\right) \approx 41.4^\circ$$

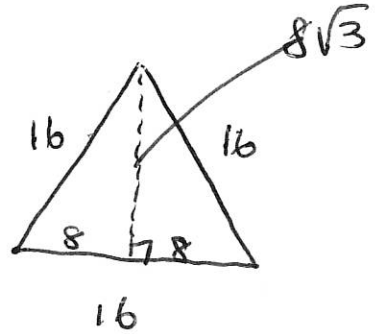
17.)



$$\sin\beta = \frac{25}{45}$$

$$m\angle\beta = \sin^{-1}\left(\frac{25}{45}\right) \approx 33.7^\circ$$

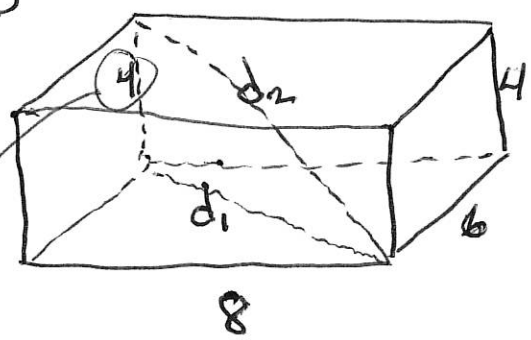
18.)



$$A = \frac{1}{2}bh$$

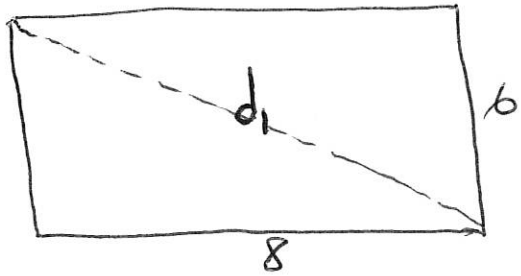
$$= \frac{1}{\cancel{2}}(\overset{8}{\cancel{16}})(8\sqrt{3}) = \boxed{64\sqrt{3}\ cm^2}$$

19.)



STEP 1:

- OUR GOAL IS d_2 – THE DIAGONAL LENGTH OF THE RECTANGULAR PRISM.
- WE MUST FIRST DETERMINE d_1 – THE DIAGONAL LENGTH OF THE BASE:



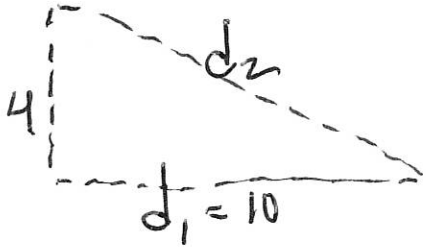
ABOVE VIEW OF THE BASE AND d_1

$$d_1 = \sqrt{6^2 + 8^2}$$

(OR JUST USE 3-4-5 WITH A MULTIPLIER = 2)

$$d_1 = 10$$

STEP 2: USE $d_1 = 10$ TO FIND d_2:



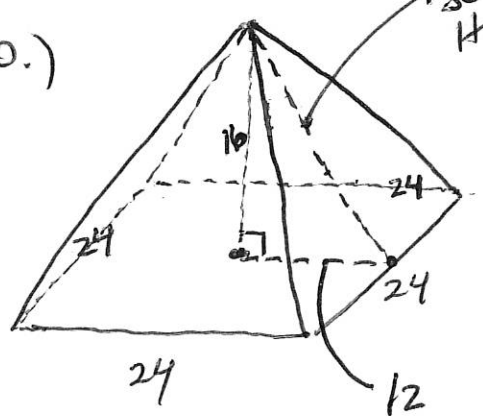
$$d_2^2 = 4^2 + 10^2$$

$$d_2 = \sqrt{16 + 100}$$

$$d_2 = \sqrt{116}$$

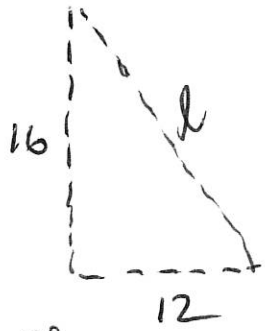
$$d_2 = \sqrt{\underbrace{4 \cdot 29}_{2}} = \boxed{2\sqrt{29}}$$

20.)



IF $p = 96$ FOR THE SQUARE BASE, THEN $s = 96/4$ FOR ANY SIDE OF THE BASE : $96/4 = 24$

SHOWN IS THE CUT-AWAY VIEW OF THE TRIANGLE OF INTEREST:

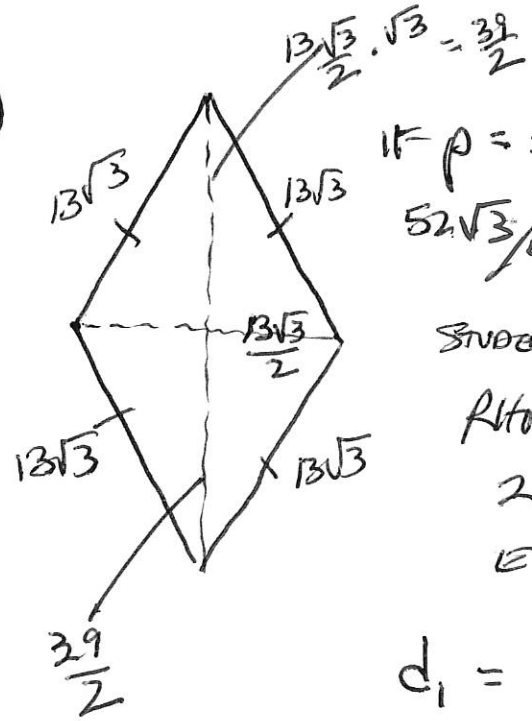


ℓ MAY BE QUICKLY DETERMINED USING THE PYTHAG. TRIPLE 3-4-5 AND A MULTIPLIER OF 4:

$$\begin{array}{ccc} 3 & 4 & 5 \\ \downarrow & \downarrow & \downarrow \\ 12 & 16 & \boxed{20} \end{array}$$

$$\boxed{\ell = 20 \text{ mm}}$$

21.)



IF $p = 52\sqrt{3}$, EA SIDE MUST BE $52\sqrt{3}/4 = 13\sqrt{3}$

STUDENTS SHOULD NOW RECOGNIZE A RHOMBUS W/ 120° ANGLES AS BEING 2 $\cong$ EQUILAT ΔS STACKED ON EA. OTHER!

$$d_1 = \frac{13\sqrt{3}}{2} + \frac{13\sqrt{3}}{2} \text{ OR JUST } \boxed{13\sqrt{3}}$$

$$d_2 = \frac{39}{2} + \frac{39}{2} \text{ OR JUST } \boxed{39}$$

B1.) FOR B1, SEE PRETEST!