

I. Simplify each square root – Show work (factor tree process) just like in your notes.

|                             |   |
|-----------------------------|---|
| 1.) Simplify: $\sqrt{36}$   | $\sqrt{36}$<br>$\sqrt{2 \cdot 2 \cdot 3 \cdot 3}$<br>$= 3 \cdot 2$<br>$= 6$                           |
| 2.) Simplify: $\sqrt{324}$  | $\sqrt{324}$<br>$\sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3}$<br>$= 2 \cdot 3 \cdot 3$<br>$= 18$ |
| 3.) Simplify: $3\sqrt{441}$ | $3\sqrt{441}$<br>$3\sqrt{3 \cdot 3 \cdot 7 \cdot 7}$<br>$= 3 \cdot 3 \cdot 7$<br>$= 63$               |

|                             |  |
|-----------------------------|--|
| 4.) Simplify: $\sqrt{96}$   | $\sqrt{96}$<br>$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 2}$<br>$= 2 \cdot 2 \cdot \sqrt{3}$<br>$= 4\sqrt{3}$                             |
| 5.) Simplify: $2\sqrt{128}$ | $2\sqrt{128}$<br>$2\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$<br>$= 2 \cdot 2 \cdot 2 \cdot 2 \cdot \sqrt{2}$<br>$= 16\sqrt{2}$ |
| 6.) Simplify: $\sqrt{245}$  | $\sqrt{245}$<br>$\sqrt{5 \cdot 7 \cdot 7}$<br>$= 7\sqrt{5}$  |

|   |  |
|---|--|
| 7.) Simplify: $\sqrt{8 \cdot 46}$           | $\sqrt{8 \cdot 46}$<br>$\sqrt{2 \cdot 2 \cdot 2 \cdot 23}$<br>$= 2 \cdot \sqrt{23}$<br>$= 2\sqrt{23}$                                    |
| 8.) Simplify: $5\sqrt{12 \cdot 3}$          | $5\sqrt{12 \cdot 3}$<br>$5\sqrt{2 \cdot 2 \cdot 3 \cdot 3}$<br>$= 5 \cdot 2 \cdot 3$<br>$= 30$   |
| 9.) Simplify: $6\sqrt{20 \cdot 2 \cdot 45}$ | $6\sqrt{20 \cdot 2 \cdot 45}$<br>$6\sqrt{2 \cdot 2 \cdot 5 \cdot 2 \cdot 3 \cdot 3 \cdot 5}$<br>$= 6 \cdot 2 \cdot 3 \cdot 5$<br>$= 180$ |

|   |  |
|---|--|
| 10.) Simplify: $\frac{3\sqrt{2}}{2\sqrt{18}}$ | $\frac{3\sqrt{2}}{2\sqrt{18}}$<br>$\frac{3\sqrt{2}}{2 \cdot \sqrt{2 \cdot 3 \cdot 3}}$<br>$= \frac{3\sqrt{2}}{2 \cdot 3\sqrt{2}}$<br>$= \frac{3}{6}$<br>$= \frac{1}{2}$                |
| 11.) Simplify: $\frac{10\sqrt{6}}{\sqrt{50}}$ | $\frac{10\sqrt{6}}{\sqrt{50}}$<br>$\frac{10\sqrt{2 \cdot 3}}{\sqrt{2 \cdot 5 \cdot 5}}$<br>$= \frac{10\sqrt{2} \cdot \sqrt{3}}{5\sqrt{2}}$<br>$= 2\sqrt{3}$                            |
| 12.) Simplify: $\frac{2\sqrt{56}}{\sqrt{14}}$ | $\frac{2\sqrt{56}}{\sqrt{14}}$<br>$\frac{2\sqrt{2 \cdot 2 \cdot 2 \cdot 7}}{\sqrt{2 \cdot 7}}$<br>$= \frac{2 \cdot 2 \cdot \sqrt{2} \cdot \sqrt{7}}{\sqrt{2} \cdot \sqrt{7}}$<br>$= 4$ |

II. Find the length of the missing side of each given right triangle. Show work!!

- 13.)  $x = 4\sqrt{5}$
- 14.)  $x = 2\sqrt{3}$
- 15.)  $x = 4\sqrt{2}$
- 16.)  $x = \sqrt{5}$
- 17.)  $x = 9\sqrt{2}$
- 18.)  $x = 4$
- 19.)  $x = 1$
- 20.)  $x = 3\sqrt{2}$
- 21.)  $x = 2\sqrt{13}$

- 22.)  $x = 3\sqrt{13}$
- 23.)  $x = 2\sqrt{3}$
- 24.)  $x = 5\sqrt{3}$

III. For the following: a.) Draw a picture and set up an equation (using the Pythagorean Theorem). b.) Solve the equation and round answers to tenth place (include units).

- 25.) An older floppy diskettes measured  $5\frac{1}{4}$  inches on each side. What is the diagonal length of the diskette?  $7.4\text{ in}$
- 26.) A jogger runs 8 mi N and then 5 mi W. What is the distance the jogger must run back to his starting point?  $9.4\text{ mi}$
- 27.) A suitcase measures 24 in long and has a diagonal length of 30 in. How high is the suitcase?  $18\text{ in}$
- 28.) Oscar's dog house is shaped like a tent. The slanted sides are both 5 ft long and the height is 4 ft. What is the length across the entire bottom of the tent?  $6\text{ ft}$
- 29.) A computer monitor is labeled at 19 in (which represents the length of the diagonal) and the screen measures to be 10 in in height. What is the actual width of the computer monitor?  $16.2\text{ in}$
- 30.) Seth wants to make a table where the diagonal measures to be  $12\sqrt{2}$  inches. What must the sides be cut out to so that Seth makes a square table?  $12\text{ in}$

## Adv Functions - Simplify Sq Roots/Pyth Thm wS.

$$\begin{aligned} 13) \quad 8^2 + x^2 &= 12^2 \\ 64 + x^2 &= 144 \\ \underline{-64} \quad \underline{-64} \\ x^2 &= 80 \\ x &= \sqrt{2^2 \cdot 2^2 \cdot 5} \\ \boxed{x = 4\sqrt{5}} \end{aligned}$$

$$\begin{aligned} 14) \quad (\sqrt{3})^2 + 3^2 &= x^2 \\ 3 + 9 &= x^2 \\ 12 &= x^2 \\ \sqrt{2^2 \cdot 3} &= x \\ \boxed{x = 2\sqrt{3}} \end{aligned}$$

$$\begin{aligned} 15) \quad x^2 + 10^2 &= 14^2 \\ x^2 + 100 &= 196 \\ \underline{-100} \quad \underline{-100} \\ x^2 &= 96 \\ x &= \sqrt{2^2 \cdot 2^2 \cdot 2 \cdot 3} \\ \boxed{x = 4\sqrt{6}} \end{aligned}$$

$$\begin{aligned} 16) \quad x^2 + (\sqrt{7})^2 &= (2\sqrt{3})^2 \\ x^2 + 7 &= 12 \\ \underline{-7} \quad \underline{-7} \\ x^2 &= 5 \\ \boxed{x = \sqrt{5}} \end{aligned}$$

$$\begin{aligned} 17) \quad 9^2 + 9^2 &= x^2 \\ 81 + 81 &= x^2 \\ 162 &= x^2 \\ x &= \sqrt{3^2 \cdot 3^2 \cdot 2} \\ \boxed{x = 9\sqrt{2}} \end{aligned}$$

$$\begin{aligned} 18) \quad (\sqrt{10})^2 + (\sqrt{6})^2 &= x^2 \\ 10 + 6 &= x^2 \\ 16 &= x^2 \\ \sqrt{2^2 \cdot 2^2} &= x \\ \boxed{x = 4} \end{aligned}$$

$$\begin{aligned} 19) \quad x^2 + (2\sqrt{3})^2 &= (\sqrt{13})^2 \\ x^2 + 12 &= 13 \\ \underline{-12} \quad \underline{-12} \\ x^2 &= 1 \\ \boxed{x = 1} \end{aligned}$$

$$\begin{aligned} 20) \quad (\sqrt{10})^2 + (2\sqrt{2})^2 &= x^2 \\ 10 + 8 &= x^2 \\ 18 &= x^2 \\ \sqrt{3^2 \cdot 2} &= x \\ \boxed{x = 3\sqrt{2}} \end{aligned}$$

$$\begin{aligned} 21) \quad x^2 + 12^2 &= 14^2 \\ x^2 + 144 &= 196 \\ \underline{-144} \quad \underline{-144} \\ x^2 &= 52 \\ x &= \sqrt{2^2 \cdot 13} \\ \boxed{x = 2\sqrt{13}} \end{aligned}$$

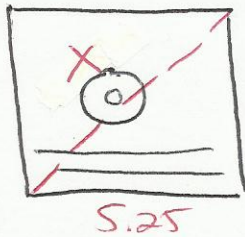
$$\begin{aligned} 22) \quad 6^2 + 9^2 &= x^2 \\ 36 + 81 &= x^2 \\ 117 &= x^2 \\ \sqrt{3^2 \cdot 13} &= x \\ \boxed{x = 3\sqrt{13}} \end{aligned}$$

$$\begin{aligned} 23) \quad 2^2 + (2\sqrt{3})^2 &= x^2 \\ 4 + 12 &= x^2 \\ 16 &= x^2 \\ \sqrt{2^2 \cdot 3} &= x \\ \boxed{x = 2\sqrt{3}} \end{aligned}$$

$$\begin{aligned} 24) \quad (\sqrt{26})^2 + 7^2 &= x^2 \\ 26 + 49 &= x^2 \\ 75 &= x^2 \\ \sqrt{5^2 \cdot 3} &= x \\ \boxed{x = 5\sqrt{3}} \end{aligned}$$



25)



5.25

5.25

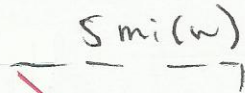
$$5.25^2 + 5.25^2 = X^2$$

$$27.5625 + 27.5625 = X^2$$

$$\sqrt{X^2} = \sqrt{55.125}$$

$$X = 7.4 \text{ inches}$$

26)



8 mi (N)

(jogger's start pt.)

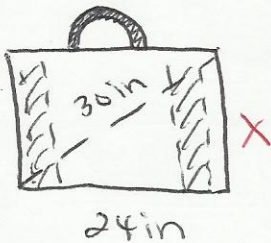
$$5^2 + 8^2 = X^2$$

$$25 + 64 = X^2$$

$$\sqrt{89} = \sqrt{X^2}$$

$$X = 9.4 \text{ miles}$$

27)



24 in

$$X^2 + 24^2 = 30^2$$

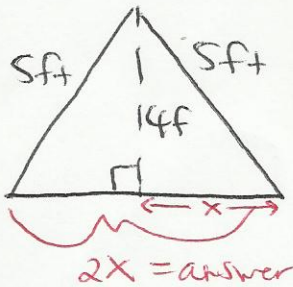
$$X^2 + 576 = 900$$

$$\begin{array}{r} -576 \\ \hline \end{array} \quad \begin{array}{r} -576 \\ \hline \end{array}$$

$$\sqrt{X^2} = \sqrt{324}$$

$$X = 18 \text{ in}$$

28)



2X = answer

$$4^2 + X^2 = 5^2$$

$$16 + X^2 = 25$$

$$\begin{array}{r} -16 \\ \hline \end{array} \quad \begin{array}{r} -16 \\ \hline \end{array}$$

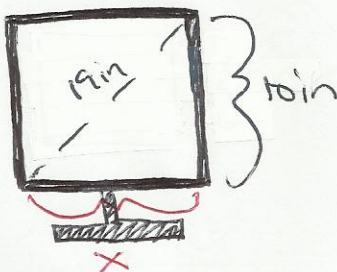
$$\sqrt{X^2} = \sqrt{9}$$

$$X = 3$$

$$\text{answer} = 2(3)$$

$$= 6 \text{ ft}$$

29)



10 in

$$X^2 + 10^2 = 19^2$$

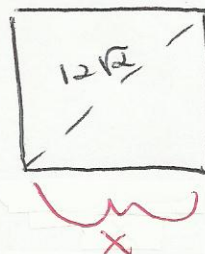
$$X^2 + 100 = 361$$

$$\begin{array}{r} -100 \\ \hline \end{array} \quad \begin{array}{r} -100 \\ \hline \end{array}$$

$$\sqrt{X^2} = \sqrt{261}$$

$$X = 16.2 \text{ in}$$

30)



X

(X to be same since want a square)

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

$$\frac{2X^2}{2} = \frac{3456}{2}$$

$$\sqrt{X^2} = \sqrt{1728}$$

$$X = 41.6 \text{ in}$$