Advanced Functions – 6.1 WS: Review of Radicals/PT Name: Key

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

1.) Simplify: $\sqrt{36}$

36 → 6, 6 → 3, 2, 3, 2

$\sqrt{3^2 \cdot 2^2}$

$= 3 \cdot 2$

$= \boxed{6}$

2.) Simplify: $\sqrt{324}$

324 → 4, 81 → 2, 2, 9, 9 → 3, 3, 3, 3

$\sqrt{2^2 \cdot 3^2 \cdot 3^2}$

$= 2 \cdot 3 \cdot 3$

$= \boxed{18}$

3.) Simplify: $3\sqrt{441}$

441 → 7, 63 → 9, 7 → 3, 3

$3\sqrt{3^2 \cdot 7^2}$

$= 3 \cdot 3 \cdot 7$

$= \boxed{63}$

4.) Simplify: $\sqrt{96}$

96 → 6, 16 → 3, 2, 4, 4 → 2, 2, 2, 2

$\sqrt{3 \cdot 2^5}$

$= \sqrt{3 \cdot 2^2 \cdot 2^2 \cdot 2}$

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

$= \boxed{4\sqrt{6}}$

5.) Simplify: $2\sqrt{128}$

128 → 16, 8 → 4, 4, 4, 2 → 2, 2, 2, 2, 2, 2

$2\sqrt{2^7}$

$2\sqrt{2^2 \cdot 2^2 \cdot 2^2 \cdot 2}$

$= 2 \cdot 2 \cdot 2 \cdot 2\sqrt{2}$

$= \boxed{16\sqrt{2}}$

6.) Simplify: $\sqrt{245}$

245 → 5, 49 → 7, 7

$\sqrt{7^2 \cdot 5}$

$= \boxed{7\sqrt{5}}$

7.) Simplify: ~~$\sqrt{8} \cdot 4\sqrt{6}$~~ $= 4\sqrt{48}$

48 → 6, 8 → 2, 3, 4, 2 → 2, 2

$4\sqrt{2^4 \cdot 3}$

$= 4\sqrt{2^2 \cdot 2^2 \cdot 3}$

$= 4 \cdot 2 \cdot 2\sqrt{3}$

$= \boxed{16\sqrt{3}}$

8.) Simplify: ~~$5\sqrt{12} \cdot 3\sqrt{9}$~~ $= 15\sqrt{108}$

108 → 9, 12 → 3, 3, 4, 3 → 2, 2

$15\sqrt{2^2 \cdot 3^3}$

$= 15\sqrt{2^2 \cdot 3^2 \cdot 3}$

$= 15 \cdot 2 \cdot 3\sqrt{3}$

$= \boxed{90\sqrt{3}}$

9.) Simplify: $6\sqrt{20} \cdot 2\sqrt{45}$ $12\sqrt{900}$

900 → 9, 100 → 3, 3, 10, 10 → 5, 2, 5, 2

$12\sqrt{3^2 \cdot 2^2 \cdot 5^2}$

$= 12 \cdot 3 \cdot 2 \cdot 5$

$= \boxed{360}$

10.) Simplify: $\dfrac{3\sqrt{2}}{2\sqrt{18}}$

18 → 9, 2 → 3, 3

$\dfrac{3\sqrt{2}}{2\sqrt{3^2 \cdot 2}}$

$= \dfrac{3\sqrt{2}}{6\sqrt{2}}$

$= \boxed{\dfrac{1}{2}}$

11.) Simplify: $\dfrac{10\sqrt{6}}{\sqrt{50}}$

50 → 25, 2 → 5, 5

$\dfrac{10\sqrt{6}}{\sqrt{5^2 \cdot 2}}$

$= \dfrac{2\,\cancel{10}\sqrt{6}}{\cancel{5}\sqrt{2}}$

$= \dfrac{2\sqrt{6}}{\sqrt{2}} = \boxed{2\sqrt{3}}$

12.) Simplify: $\dfrac{2\sqrt{56}}{4\sqrt{14}}$

56 → 7, 8 → 4, 2 → 2, 2

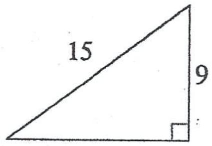
$\dfrac{2\sqrt{2^2 \cdot 2 \cdot 7}}{4\sqrt{14}}$

$= \dfrac{4\sqrt{14}}{4\sqrt{14}}$

$= \boxed{1}$

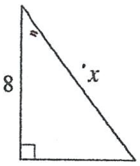
II. Find the length of missing side x of each given right triangle. Keep in radical form. Show work!!

13.)



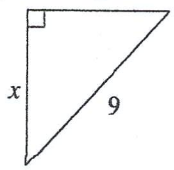
$x^2+9^2=15^2$
$x^2=144$
$x=12$

14.)



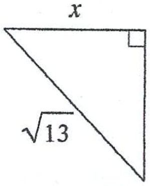
$8^2+6^2=x^2$
$x^2=100$
$x=10$

15.)



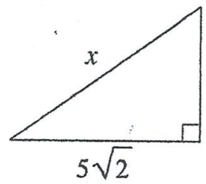
$x^2+6^2=9^2$
$x^2=45$
$x=3\sqrt{5}$

16.)



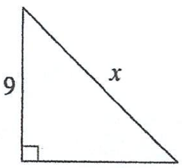
$x^2+(\sqrt{7})^2=(\sqrt{13})^2$
$x^2+7=13$
$x^2=6$
$x=\sqrt{6}$

17.)



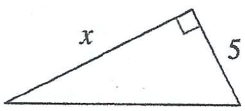
$(5\sqrt{2})^2+5^2=x^2$
$75=x^2$
$x=5\sqrt{3}$

18.)



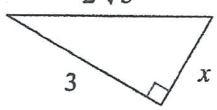
$9^2+9^2=x^2$
$x^2=162$
$x=9\sqrt{2}$

19.)



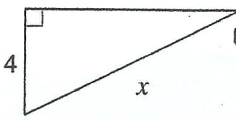
$x^2+5^2=11^2$
$x^2=96$
$x=4\sqrt{6}$

20.)



$x^2+3^2=(2\sqrt{3})^2$
$x^2+9=12$
$x^2=3$
$x=\sqrt{3}$

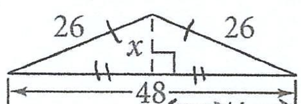
21.)



$4^2+8^2=x^2$
$x^2=80$
$x=4\sqrt{5}$

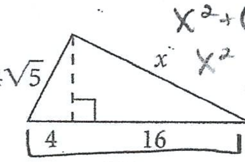
III. Find the length of side x. Round to tenth place. Show work!!

22.)



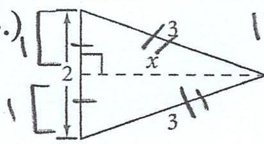
$x^2+24^2=26^2$
$x^2=100 \rightarrow x=10$

23.)



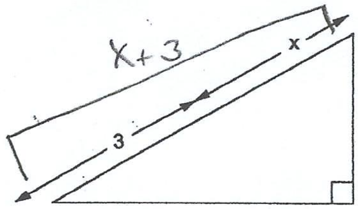
$x^2+(4\sqrt{5})^2=20^2$
$x^2+80=400$
$x^2=320$
$x=17.9$

24.)



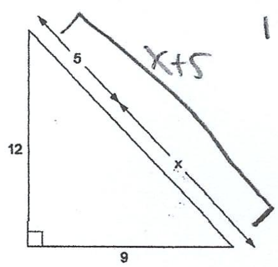
$1^2+x^2=3^2$
$x^2=8$
$x=2.8$

25.)



$x^2+8^2=(x+3)^2$
$x^2+64=x^2+6x+9$
$-x^2 \quad -x^2$
$64=6x+9$
$6x=55$
$x=9.2$

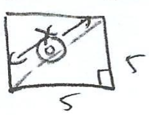
26.)



$12^2+9^2=(x+5)^2$
$225=x^2+10x+25$
$-225 \quad -225$
$x^2+10x-200=0$
$x=\frac{-10+\sqrt{(10)^2-4(1)(-200)}}{2(1)}$
$x=10$

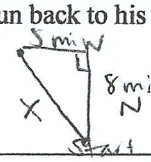
IV. Complete problem by drawing a picture. Round to tenth place. Show work!!

27.) An older floppy diskettes measured 5 inches on each side. What is the diagonal length of the diskette?



$5^2+5^2=x^2$
$x^2=50$
$x=7.1$ in

28.) A jogger runs 8 mi N and then 5 mi W. What is the distance the jogger must run back to his starting point?

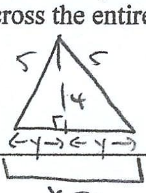


$5^2+8^2=x^2$
$x^2=89$
$x=9.4$ mi

29.) A suitcase measures 24 in long and has a diagonal length of 30 in. How high is the suitcase?

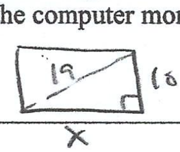
$x^2+24^2=30^2$
$x^2=324$
$x=18$ in

30.) 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 tenth?



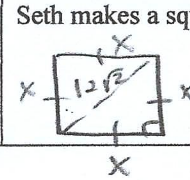
$y^2+4^2=5^2$
$y^2=9 \rightarrow y=3$
$x=2y=2(3)$
$x=6$ ft

31.) 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?



$x^2+10^2=19^2$
$x^2=261$
$x=16.2$ in

32.) 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?



$x^2+x^2=(12\sqrt{2})^2$
$2x^2=288$
$x^2=144$
$x=12$ in