Name:_____   Date:_____

<u>Math 9H Section 2.5 Operations with Radicals</u>

1. Simplify each of the following expressions by multiplication or division:

$a)\sqrt{12}\times\sqrt{24}$	$b)\sqrt{8}\times\sqrt{18}$	$c)2\sqrt{5}\times3\sqrt{2}$
$d)-8\sqrt{6}\times3\sqrt{8}$	$e)11\sqrt{3}\times4\sqrt{27}$	$f)\sqrt{20}\times\sqrt{32}\times\sqrt{18}\times\sqrt{125}$
$g)0.8\sqrt{80}\times0.125\sqrt{90}\times0.5\sqrt{50}$	$h)5\sqrt{3d}\times2\sqrt{2d}\times3\sqrt{3d}$	$i)7\sqrt{6a}\times3\sqrt{2b}\times2\sqrt{3ab}$

2. Simplify each of the following expressions by addition or subtraction

$a)5\sqrt{7}-3\sqrt{7}+6\sqrt{7}$	$b)2\sqrt{10}+7\sqrt{10}-6\sqrt{10}$	$c)\sqrt{12}-2\sqrt{75}$
$d)\sqrt{54}+\sqrt{150}-2\sqrt{216}$	$e)\sqrt{48}-\dfrac{2}{3}\sqrt{20}-0.5\sqrt{27}+2\sqrt{45}$	$f)\dfrac{2}{5}\sqrt{125}-\dfrac{2}{3}\sqrt{243}-\dfrac{1}{3}\sqrt{45}+\dfrac{1}{2}\sqrt{48}$
$g)\dfrac{2}{3}\sqrt{72}-0.\overline{3}\sqrt{50}+0.\overline{285714}\sqrt{98}$		$h)\dfrac{\sqrt{8a}}{4}+\dfrac{\sqrt{27b}}{3}-0.\overline{3}\sqrt{50a}-4\sqrt{75b}$

3. Expand and simplify each of the following expressions:

$a)\sqrt{2}\left(\sqrt{5}-\sqrt{7}\right)$	$b)2\sqrt{5}\left(3\sqrt{2}+4\sqrt{3}\right)$	$c)6\sqrt{6}\left(3\sqrt{2}-4\sqrt{3}\right)$
$d)-4\sqrt{3}\left(2\sqrt{5}-6\sqrt{6}-3\sqrt{12}\right)$	$e)2\sqrt{3}\left(5\sqrt{8}+2\sqrt{3}-4\sqrt{5}+3\sqrt{6}\right)$ $f)\left(\sqrt{8}-5\right)\left(\sqrt{2}-3\right)$	
$g)\left(3-\sqrt{2}\right)^{2}$	$h)\left(4\sqrt{2}-2\sqrt{3}\right)\left(4\sqrt{2}+2\sqrt{3}\right)$	$i)\left(6\sqrt{8}-3\sqrt{2}\right)\left(6\sqrt{8}+3\sqrt{2}\right)$

4. Rationalize each of the following expressions:

$a)\dfrac{\sqrt{24}}{\sqrt{3}}$	$b)\dfrac{3\sqrt{20}}{2\sqrt{10}}$	$c)\dfrac{3\sqrt{18}}{5\sqrt{24}}$
$d)\dfrac{1}{\sqrt{5}}-\dfrac{1}{\sqrt{3}}$	$e)\dfrac{1}{\sqrt{3}}+\dfrac{2}{\sqrt{6}}$	$f)\dfrac{5}{\sqrt{5}}-\dfrac{8}{\sqrt{2}}$
$g)\dfrac{3\sqrt{48}}{2\sqrt{75}}-\dfrac{2\sqrt{24}}{\sqrt{96}}$	$h)\dfrac{3\sqrt{5}}{\sqrt{20}}+\dfrac{4\sqrt{3}}{\sqrt{27}}$	$i)\dfrac{2\sqrt{3}}{\sqrt{9}}-\dfrac{3\sqrt{5}}{\sqrt{125}}$

5. If $A = 2\sqrt{6}$ and $B = 6\sqrt{2}$ find each of the following:

a) $A \times B$ b. $2AB - \left(AB\right)^2$ c) $\dfrac{A^2 - B^2}{3A}$

6. What is $\sqrt{6} \times \sqrt[3]{2}$ equal to? (Justify your answer:) Choose one:

a) $\sqrt[3]{12}$ b) $\sqrt{12}$ c) $\sqrt[6]{12}$ d) Can't multiply them

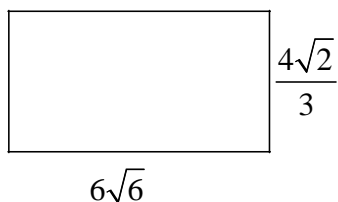7. Find the unknown value "K" in each of the following expressions:

a) $K \times 3\sqrt{24} = 2\sqrt{3} \times 6\sqrt{10}$ b) $8\sqrt{3} = \dfrac{4\sqrt{48}}{\sqrt{K}}$
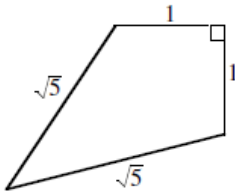
Answer:_____ Answer:_____

8. Find the PERIMETER and AREA of the following rectangle:

$\dfrac{4\sqrt{2}}{3}$

$6\sqrt{6}$
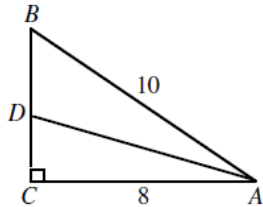
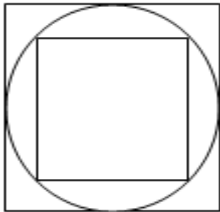Answer:_____

9. Given the following dimensions, find the area of the quadrilateral:

Answer:_____

10. Triangle ABC is right-angled with $AB = 10$cm and $AC = 8$cm. If $BC = 3DC$, then AD equals:

Answer:_____

11. A circle is inscribing and circumscribing two separate squares. If the area of the large square is $100m^2$, find the area of the small square:
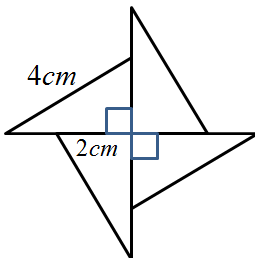
Answer:_____

12. A circle is inscribing and circumscribing two separate equilateral triangles. Within the inner triangle, another circle is inscribed. If the radius of the small circle is 3cm, what is the perimeter of the larger triangle?
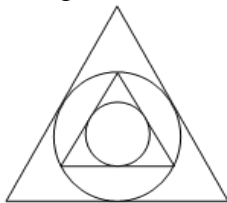
Answer:_____

13. Each right triangle in the figure shown has a hypotenuse 4cm and the shortest side 2 cm. Find the perimeter of the figure:

Answer:_____

14. A square and a rectangle have the same width. If the diagonal of the rectangle is 5 times the diagonal of the square, what is the ratio of the length of the rectangle to the length of the square?

Answer:_____
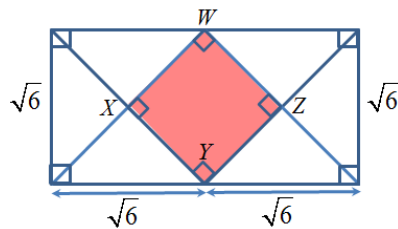
15. Arrange in order from the least to the greatest:

a) $-6\sqrt{2}, \; -3\sqrt{7}, \; -2\sqrt{17}, \; -4\sqrt{5}, \; -2\sqrt{21}, \; -5\sqrt{3}$ Answer:_____

b) $6\sqrt{0.1}, \; 3\sqrt{0.7}, \; 7\sqrt{0.05}, \; 2\sqrt{0.8}, \; 4\sqrt{0.5}, \; 5\sqrt{0.3}$ Answer:_____
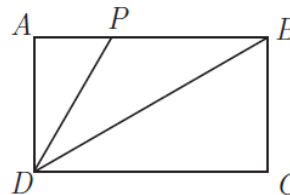
16. In the diagram, what is the area of square WXYZ

Answer:_____

17.

. In rectangle $ABCD$, $AD = 1$, P is on $\overline{AB}$, and $\overline{DB}$ and $\overline{DP}$ trisect $\angle ADC$. What is the perimeter of $\triangle BDP$?

(A) $3 + \dfrac{\sqrt{3}}{3}$ (B) $2 + \dfrac{4\sqrt{3}}{3}$ (C) $2 + 2\sqrt{2}$

(D) $\dfrac{3 + 3\sqrt{5}}{2}$ (E) $2 + \dfrac{5\sqrt{3}}{3}$

18.

Simplify

$$\sqrt[3]{x\sqrt[3]{x\sqrt[3]{x\sqrt{x}}}}.$$

(A) $\sqrt{x}$ (B) $\sqrt[3]{x^2}$ (C) $\sqrt[27]{x^2}$ (D) $\sqrt[54]{x}$ (E) $\sqrt[81]{x^{80}}$