Name:_____   Date:_____

HW Pre-Calculus 11 Section 5.1 Basics with Radicals

1. Simplify each of the following and convert it to a mixed radical

a) $\sqrt{72}$	b) $\sqrt{128}$	c) $\sqrt{125}$
d) $\sqrt{600}$	e) $3\sqrt{8}$	f) $\sqrt{a^3 b^4 c}$
g) $\sqrt[3]{88}$	h) $\sqrt[3]{54}$	i) $\sqrt[4]{96}$
j) $\sqrt[3]{a^5 b^3 c^4}$	k) $\sqrt[4]{6480}$	L) $\sqrt[3]{a^n b^{n+2} c^{n-1}}$

2. Simplify by Adding or Subtracting the radicals:

a) $5\sqrt{9} + 2\sqrt{49}$	b) $2\sqrt{12} - \sqrt{3}$	c) $2\sqrt{10} + 7\sqrt{10} - 6\sqrt{10}$
d) $5\sqrt{7} - 3\sqrt{7} + 6\sqrt{7}$	e) $5\sqrt{3} - 7\sqrt{12} + 2\sqrt{27}$	f) $3\sqrt{12} + 2\sqrt{75} - 2\sqrt{3}$
g) $\sqrt{54} + \sqrt{150} - 2\sqrt{216}$	h) $4\sqrt{12} + \sqrt{300} - 2\sqrt{147}$	i) $\frac{1}{3}\sqrt{180} - 3\sqrt{245} - 2\sqrt{80}$

|	
J) $4\sqrt{180} - 3\sqrt{250} - \dfrac{1}{5}\sqrt{125} + \dfrac{1}{2}\sqrt{40}$	k) $9\sqrt{75} - \dfrac{11}{3}\sqrt{18} - 12\sqrt{72} + \dfrac{5}{2}\sqrt{12}$
L) $\dfrac{2}{5}\sqrt{125} - \dfrac{2}{3}\sqrt{243} - \dfrac{1}{3}\sqrt{45} + \dfrac{1}{2}\sqrt{48}$	m) $\sqrt{48} - \dfrac{2}{3}\sqrt{20} - 0.5\sqrt{27} + 2\sqrt{45}$
O) $b\sqrt{27a^3b} - a\sqrt{3ab^3} - 2\sqrt{75a^3b^3} + 4\sqrt[3]{a^4b^4}$	p) $\dfrac{\sqrt{8a}}{4} + \dfrac{\sqrt{27b}}{3} - 0.\overline{3}\sqrt{50a} - 4\sqrt{75b}$

3. The area of a square is 8 and the perimeter is $a\sqrt{b}$, what are the values of "a' and "b"?

4. Arrange each of the following from Least to Greatest:

    $a)$ $-6\sqrt{2}, \quad -3\sqrt{7}, \quad -2\sqrt{17}, \quad -4\sqrt{5}, \quad -2\sqrt{21}, \quad -5\sqrt{3}$

    $b)$ $6\sqrt{0.1}, \quad 3\sqrt{0.7}, \quad 7\sqrt{0.05}, \quad 2\sqrt{0.8}, \quad 4\sqrt{0.5}, \quad 5\sqrt{0.3}$

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

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

$6\sqrt{6}$
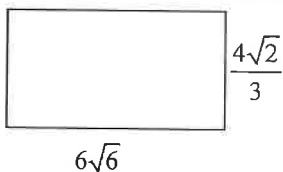
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HW Pre-Calculus 11 Section 5.2 Multiplying Dividing and Rationalizing with Radicals

1. Multiply each of the following radicals:

a) $\sqrt{24} \times \sqrt{6}$	b) $3\sqrt{12} \times 5\sqrt{8}$	c) $5\sqrt[3]{50} \times 3\sqrt[3]{60}$
d) $-4\sqrt[3]{-100} \times 2\sqrt[3]{54}$	e) $\sqrt[3]{a^2bc^3} \times \sqrt[3]{a^5b^4c^2}$	f) $\sqrt[4]{32x^3y} \times \sqrt[4]{64x^2y^7}$
g) $2\sqrt{3}\left(4\sqrt{21} + 5\sqrt{15}\right)$	h) $4\sqrt{5}\left(6\sqrt{40} + 3\sqrt{50} - 2\sqrt{90}\right)$	i) $5\sqrt{6}\left(4\sqrt{24} - 3\sqrt{48} - 5\sqrt{54}\right)$
j) $\left(3\sqrt{2} + 4\sqrt{3}\right)\left(5\sqrt{3} - \sqrt{8}\right)$	k) $\left(\sqrt{6} - \sqrt{8}\right)\left(\sqrt{2} + \sqrt{5} + 4\right)$	
L) $\left(3\sqrt[3]{8x^2} + \sqrt[3]{4x^2}\right)\left(\sqrt[3]{2x^2} - 6\sqrt[3]{8x^2}\right)$	m) $\left(8a - 6\sqrt[3]{3r}\right)\left(2\sqrt[3]{18r^2} + 4\sqrt[3]{45r}\right)$	

2. Divide and Rationalize each of the following radicals:

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) $\dfrac{2\sqrt{3}}{\sqrt{9}} - \dfrac{3\sqrt{5}}{\sqrt{125}}$
j) $\dfrac{1}{\sqrt{2} - \sqrt{3}}$	k) $\dfrac{2}{2\sqrt{3} + 5}$	L) $\dfrac{\sqrt{2}}{2\sqrt{3} + \sqrt{5}}$
m) $\dfrac{\sqrt{2} + \sqrt{3}}{\sqrt{3} - \sqrt{2}}$	n) $\dfrac{5\sqrt{3}}{2\sqrt{2} - 3\sqrt{3}}$	p) $\dfrac{x^4 + x^2}{\sqrt{x^3}}$

Q) $\dfrac{5}{\sqrt[3]{x^2}}$	R) $\dfrac{\sqrt[3]{3}+4\sqrt[3]{3}}{\sqrt[3]{3^2}}$	S) $\dfrac{\sqrt[4]{6}-3\sqrt[4]{6}}{\sqrt[4]{216}}$

3.) Is the following statement true or false? Explain: $\sqrt{-3}\times\sqrt{-27}=9$

4. The following student rationalized the expression with the steps shown. Indicate any errors that you see:

$$\frac{5-\sqrt{a}}{\sqrt{a}-4}=\frac{5-\sqrt{a}}{\sqrt{a}-4}\times\frac{\left(\sqrt{a}+4\right)}{\left(\sqrt{a}+4\right)}$$

$$=\frac{5\sqrt{a}-a+20}{a-4}$$

$$=\frac{5\sqrt{a}+20}{-4}$$

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

a) $K\times3\sqrt{24}=2\sqrt{3}\times6\sqrt{10}$

b) $8\sqrt{3}=\dfrac{4\sqrt{48}}{\sqrt{K}}$

6.) Find the volume of a box given the dimensions: Height: $3\sqrt{2}+4$, Width: $4\sqrt{5}-2\sqrt{3}$, Length: $4\sqrt{5}+2\sqrt{3}$

7. Each right triangle in the figure shown has a hypotenuse 4cm and the shortest side 2 cm. Find the perimeter of the figure:
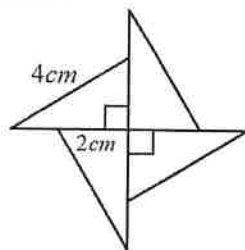
8. Challenge: Find the sum of the expression without a calculator:

$$\frac{1}{3+2\sqrt{2}}+\frac{1}{2\sqrt{2}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{5}}+\frac{1}{\sqrt{5}+2}+\frac{1}{2+\sqrt{3}}$$

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HW Pre-Calculus 11 Section 5.3 Solving Equations with Radicals:

1. Solve each of the following equations algebraically. Make sure you check for extraneous roots:

a) $\sqrt{3x+7} = 21$	b) $\sqrt{2x-5} - 10 = 0$
c) $5 - \sqrt{2x-11} = 3$	d) $2\sqrt{4x-1} + 8 = 16$
e) $\sqrt{x+2} = x$	f) $4\sqrt{x-4} = x$
g) $4 - x = \sqrt{x^2 - 8}$	h) $\sqrt{x^2+3} + x = 3$

i) $\sqrt{1+9x}+6=2x$	j) $\sqrt{7x^2-1}+1=3x$

2. What is an extraneous root? How can you check if an equation has an extraneous root?

3. Which of the following equations will have an extraneous root? Explain, Indicate Yes or NO

a) $\sqrt{3x+7}+10=0$	b) $\sqrt{2x+1}=-2x+1$
c) $-\sqrt{x}+9=0$	d) $\sqrt{3x+1}=2x+6$

4. Solve the following equations. Show all your work and steps:

a) $\sqrt{x+2}=\sqrt{2x+5}$	b) $x-12=\sqrt{x}$

c) $x = 2\sqrt{x} - 1$

d) $x = 3 - \sqrt{x^2 + 3}$

e) $\sqrt[3]{2x + 3} = 4$

f) $\sqrt[3]{(2x - 1)^2} = 9$

g) $\sqrt{x + 12} = 2 + \sqrt{x}$

h) $\sqrt{5x - 1} + 3\sqrt{x} = 1$

i) $\sqrt{2x + 4} = 3 + \sqrt{x - 5}$

j) $\sqrt{x} = \sqrt{x + 4} - 1$

k) $\sqrt{x+8} - \sqrt{x-7} = \sqrt{5}$

L) $\sqrt{3-x} - \sqrt{16+2x} = \sqrt{x+7}$

$2 + \sqrt{x-5} = \sqrt{2x-3}$

$\dfrac{2}{\sqrt{x+1}} = \sqrt{x} + \sqrt{x+1}$

$\sqrt{4-x} + \sqrt{x-9} = \sqrt{x-14}$

$\dfrac{3}{\sqrt{x}} - 5 = \dfrac{1-2\sqrt{x}}{\sqrt{x}}$

5. Solve for "c" in terms of "a" and "b" given that: $\sqrt{a+\dfrac{b}{c}} = a\sqrt{\dfrac{b}{c}}$