Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 2/5 Topic: 2D Rational Indices WS	0 1 2	
Tuesday Date: 2/6 Topic: Exponential Study Guide	0 1 2	
Wednesday Date: _____ Topic: _____	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Class Plan: Review Index Laws

1) Unit 5: Quiz Review handout
2) Finish study guide
(Due Friday, beginning of hour)

After school:

Wednesday - Garages!
Thursday after school! ***W124 :)***

B Chapter 2 **INDEX LAWS**

Product Property of Exponents

$$a^m \cdot a^n = a^{m+n}$$

Quotient Property of Exponents

$$\frac{a^m}{a^n} = a^{m-n}$$

Definition of Negative Exponents

$$a^{-n} = \frac{1}{a^n} \quad \text{or} \quad \left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$$

Zero Exponents

$$a^0 = 1$$

Power of a Power Property

$$(a^m)^n = a^{mn}$$

Power of a Product Property

$$(ab)^m = a^m b^m$$

Power of a Quotient Property

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

***Important:
Recognize how connected the properties are.

D Chapter 2 **RATIONAL INDICES**

$a^{\frac{1}{2}} = \sqrt{a}$ and $a^{\frac{1}{3}} = \sqrt[3]{a}$

$a^{\frac{1}{n}} = \sqrt[n]{a}$ where $\sqrt[n]{a}$ is called the ***n*th root of *a***.

Rational Exponents

For any real number a and integers m and $n > 1$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

Simplify. Your answer should contain only positive exponents.

1) $2nm^3 \cdot 2nm^2$

Simplify. Your answer should contain only positive exponents.

1) $2nm^3 \cdot 2nm^2$

$= 4n^2m^5$

Simplify. Your answer should contain only positive exponents.

2) $\left(x^{-1}y^{4}\right)^{3}$

Simplify. Your answer should contain only positive exponents.

2) $\left(x^{-1}y^{4}\right)^{3}$

$x^{-3}y^{12} = \boxed{\dfrac{y^{12}}{x^{3}}}$

Simplify. Your answer should contain only positive exponents.

3) $-\dfrac{3a^{-2}b^{-4}}{3a^{3}}$

Simplify. Your answer should contain only positive exponents.

3) $-\dfrac{3a^{-2}b^{-4}}{3a^{3}}$ $= -\dfrac{a^{-2}b^{-4}}{a^{3}} = \dfrac{-1}{a^{5}b^{4}}$

Simplify. Your answer should contain only positive exponents.

4) $\dfrac{-4y^4}{-3x^2y^4 \cdot -2y^3}$

Simplify. Your answer should contain only positive exponents.

4) $\dfrac{-4y^4}{-3x^2y^4 \cdot -2y^3}$ $= \dfrac{-4y^4}{6x^2y^7} = \dfrac{-2}{3x^2y^3}$

Simplify. Your answer should contain only positive exponents.

5) $\dfrac{xy^4}{(2yx^3)^2}$

Simplify. Your answer should contain only positive exponents.

5) $\dfrac{xy^4}{(2yx^3)^2}$ $= \dfrac{xy^4}{4y^2x^6} = \dfrac{y^2}{4x^5}$

Simplify. Your answer should contain only positive exponents.

6) $\left(2u^3v^4\right)^2 \cdot -2u^3v^4$

Simplify. Your answer should contain only positive exponents.

6) $(2u^3v^4)^2 \cdot -2u^3v^4$

$= 4u^6v^8 \cdot -2u^3v^4$

$= -8u^9v^{12}$

Simplify. Your answer should contain only positive exponents.

7) $3m^{\frac{1}{4}} \cdot 2m^{\frac{1}{3}}$

Simplify. Your answer should contain only positive exponents.

7) $3m^{\frac{1}{4}} \cdot 2m^{\frac{1}{3}}$ $= 6m^{\left(\frac{1}{4}+\frac{1}{3}\right)} = 6m^{7/12}$

$\frac{1}{4}+\frac{1}{3} = \frac{3}{12}+\frac{4}{12} = \frac{7}{12}$

Simplify. Your answer should contain only positive exponents.

8) $\left(x^{\frac{5}{3}}\right)^{\frac{3}{4}}$

Simplify. Your answer should contain only positive exponents.

8) $\left(x^{\frac{5}{3}}\right)^{\frac{3}{4}} = X^{5/4}$

$\frac{5}{3}\left(\frac{3}{4}\right) = \frac{15}{12} = \frac{5}{4}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

9) $\dfrac{4p^{\frac{3}{2}}}{4p^{\frac{7}{4}}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

9) $\dfrac{4p^{\frac{3}{2}}}{4p^{\frac{7}{4}}}$ $= p^{3/2 - 7/4} = p^{-1/4} = \dfrac{1}{p^{1/4}}\left(\dfrac{p^{3/4}}{p^{3/4}}\right)$

$= \dfrac{p^{3/4}}{p^{4/4}} = \boxed{\dfrac{p^{3/4}}{p}}$

$\frac{3}{2} - \frac{7}{4}$

$\frac{6}{4} - \frac{7}{4} = -\frac{1}{4}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

10) $\dfrac{2a^{\frac{1}{3}}}{3a^{\frac{7}{4}}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

10) $\dfrac{2a^{\frac{1}{3}}}{3a^{\frac{7}{4}}}$

$= \frac{2}{3}a^{\frac{1}{3}-\frac{7}{4}} = \frac{2}{3a^{17/12}}\left(\frac{a^{x/12}}{a^{7/12}}\right)$

$= \frac{2a^{x/12}}{3a^{24/12}}$

$\frac{1}{3}-\frac{7}{4}$

$\frac{4}{12}-\frac{21}{12} = -\frac{17}{12}$

$= \boxed{\frac{2a^{x/12}}{3a^{2}}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

11) $\dfrac{\left(x^2\right)^{\frac{7}{4}}}{x^{\frac{3}{2}}y^2 \cdot x^2 y^{\frac{1}{3}}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

11) $\dfrac{(x^2)^{\frac{7}{4}}}{x^{\frac{3}{2}}y^2 \cdot x^2 y^{\frac{1}{3}}}$

$= \dfrac{x^{\frac{14}{4}}}{x^{\frac{7}{2}}y^{\frac{7}{3}}} = \dfrac{x^{\frac{14}{4}}}{x^{\frac{14}{4}}y^{\frac{7}{3}}} = \dfrac{1}{y^{\frac{7}{3}}} \cdot \dfrac{y^{\frac{2}{3}}}{y^{\frac{2}{3}}}$

$x^2 = x^{\frac{4}{2}}$

$y^2 = y^{\frac{6}{3}}$

$= \dfrac{y^{\frac{2}{3}}}{y^{\frac{9}{3}}} = \boxed{\dfrac{y^{\frac{2}{3}}}{y^3}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

12) $\dfrac{x^{\frac{7}{4}}y^{4}\cdot\left(x^{-\frac{4}{3}}y^{\frac{3}{2}}\right)^{-\frac{5}{3}}\cdot y^{\frac{7}{4}}}{x^{2}y^{2}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

12) $$\frac{x^{\frac{7}{4}}y^{4}\cdot\left(x^{-\frac{4}{3}}y^{\frac{3}{2}}\right)^{-\frac{5}{3}}\cdot y^{\frac{7}{4}}}{x^{2}y^{2}}$$

$\frac{7}{4}+\frac{20}{9}$ $\quad \frac{48}{12}-\frac{15}{6}+\frac{7}{4}$

$\frac{63}{36}+\frac{80}{36}$ $\quad \frac{48}{12}-\frac{30}{12}+\frac{21}{12}$

$=\frac{143}{36}$ $\quad =\frac{39}{12}$

$\frac{7}{4}\ \frac{48}{12}\ \frac{20}{9}\ -\frac{15}{6}\ \frac{7}{4}$

$X\ Y\cdot X\ Y\ Y$

$X^{2}\ Y^{2}$

$$\frac{X^{\frac{143}{36}}\ Y^{\frac{39}{12}}}{X^{\frac{72}{36}}\ Y^{\frac{24}{12}}}=X^{\frac{71}{36}}\ Y^{\frac{15}{12}}$$

$$=X^{\frac{71}{36}}\ Y^{\frac{5}{4}}$$

13) Find Ms. Paulson's mistake(s)! Then correct them!

$$\frac{3v^{-2}\cdot 2v^{-\frac{1}{3}}}{3v^{-\frac{2}{3}}}$$

$$\frac{6v^{-\frac{6}{3}}v^{-\frac{1}{3}}}{3v^{-\frac{2}{3}}}=\frac{3v^{-\frac{7}{3}}}{v^{-\frac{2}{3}}}=3v^{-\frac{5}{3}}=\frac{3}{v^{\frac{5}{3}}}\left(\frac{v^{\frac{1}{3}}}{v^{\frac{1}{3}}}\right)=\frac{3v^{\frac{1}{3}}}{v^{\frac{6}{3}}}=\frac{3v^{\frac{1}{3}}}{v^{3}}$$

13) Find Ms. Paulson's mistake(s)! Then correct them!

= mistake!

$$\frac{3v^{-2}\cdot 2v^{-\frac{1}{3}}}{3v^{-\frac{2}{3}}}$$

$$\frac{6v^{-\frac{6}{3}}v^{-\frac{1}{3}}}{3v^{-\frac{2}{3}}}=\frac{3v^{-\frac{7}{3}}}{v^{-\frac{2}{3}}}=3v^{-\frac{5}{3}}=\frac{3}{v^{\frac{5}{3}}}\left(\frac{v^{\frac{1}{3}}}{v^{\frac{1}{3}}}\right)=\frac{3v^{\frac{1}{3}}}{v^{\frac{6}{3}}}=\frac{3v^{\frac{1}{3}}}{2v^{3}}$$

$\frac{6}{3}=2$:)

$\frac{2v^{-7/3}}{v^{-2/3}}$

$\frac{2v^{1/3}}{v^{2}}$

Solutions...

1) $4n^2m^5$

2) $\frac{y^{12}}{x^3}$

3) $-\frac{1}{a^5b^4}$

4) $-\frac{2}{3x^2y^3}$

5) $\frac{y^2}{4x^5}$

6) $-8u^9v^{12}$

7) $6m^{\frac{7}{12}}$

8) $x^{\frac{5}{4}}$

9) $\frac{p^{\frac{3}{4}}}{p}$

10) $\frac{2a^{\frac{7}{12}}}{3a^2}$

11) $\frac{y^{\frac{2}{3}}}{y^3}$

12) $y^{\frac{5}{4}}x^{\frac{71}{36}}$

13) $\frac{2v^{\frac{1}{3}}}{v^2}$