Honors Algebra 2

Name_____

Properties of Exponents and Radicals Date______ Block_____

Rule/PROPERTY	Description	Example	Solution	
Definitions.	In the algebraic term Ax^b , A is the coefficient, x is the base, and b is the exponent. The expression, Ax^b , is called a power.	$3x^2$: 3 is the coefficient, x is the base, and 2 is the power or exponent.		
1. $X^a \cdot X^b = X^{a+b}$	When you multiply powers that have the same base, you keep the base and add the exponents. *Multiply the coefficients, whether or not the bases are the same.	1. $m^2 \cdot m^7$ 2. $2^3 \cdot 2^4$ 3. $2p^3 \cdot 4p^6$	1. ~9 2.? ⁷ = 1 3. 8p ⁹	2 8
$2. \left(x^a\right)^b = x^{a \cdot b}$	When you raise a power to a power, you keep the inner base and multiply the exponents.	4. (x ³) ⁴ 5. (2 ³) ²	5.26 = 6	4
$3. (Axy)^b = A^b x^b y^b$	When you raise a product, (Axy), to an exponent, b, you raise each factor to that exponent.	6. $(3st)^2$ 7. $(a^2b^3)^2$	24 Pe	9 s² t²
4. $x^{-a} = \frac{1}{x^a}, x \neq 0$	A base raised to a negative exponent equals the reciprocal of that base to the same positive exponent. $\begin{pmatrix} 1 \\ 2 \end{pmatrix} - 3 - \begin{pmatrix} 2 \\ 1 \end{pmatrix} = 8$	8. 3^{-3} 9. $\frac{m^{-6}n^3}{p^{-2}}$	8. <u>1</u> = <u>1</u> 9.33 = 27	n3 p2
5. $x^0 = 1, x \neq 0$	Any expression raised to the exponent of zero (0) is equal to one (1).	10. 972° 11. (-47x³y-5)°	10. /	•
$6. \ \frac{x^a}{x^b} = x^{a-b}$	When you divide powers that have the same base, you keep the base and subtract the exponents.	12. $\frac{s^{12}}{s^4}$ 13. $\frac{6^{10}}{6^8}$	12. 5 ⁶ 13. 6 ² = 3(,
$7. \left(\frac{x}{v}\right)^a = \frac{x^a}{v^a}$	When you raise a quotient to an	14. $\frac{9s^2}{3s^8}$ 3 5	14 <mark>54</mark>	
$\left(\frac{1}{y}\right) = \frac{1}{y^a}$	exponent, you raise (each factor in) the numerator to the exponent and (each factor in) the denominator to the exponent.	$15. \left(\frac{x}{y}\right)^{3}$ $16. \left(\frac{5x}{6y}\right)^{2}$	15. $\frac{1}{y}$ 5 16. $5^2 x^2$	25x ²

Properties of Exponents Practice

Use the properties of exponents to simplify the expressions.

1.
$$(x^3y^4)(x^2y^5)$$



3.
$$(x^2v)$$



5.
$$(x^6y^2z^{15})^0$$



7.
$$(x^7)^y$$

9.
$$(x^{2y})(x^{3y})$$

$$2. \ \frac{x^{2y}}{x^y}$$

$$4. \ \frac{3x^3y^8}{81x^4y^5}$$



6.
$$2^x \cdot 2^x$$



$$=\left(\frac{2}{3}\right)^{x} = \left(\frac{1}{4}\right)^{x}$$

8.
$$\frac{m^{-4}}{\underline{m}^{-2} \cdot m^2} = \frac{m}{m^{-3}} = m^{-4} = \frac{1}{m^4}$$

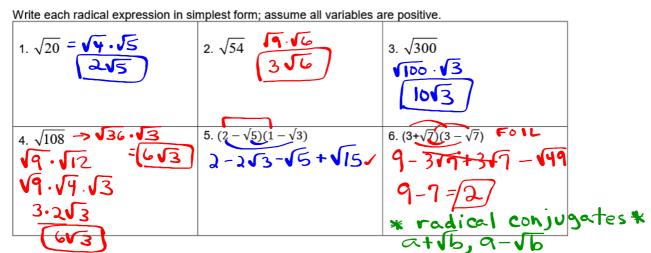
10.
$$\left(\frac{c^9}{d^3}\right)^2$$

Simplifying using Properties of Radicals (not using your calculator)

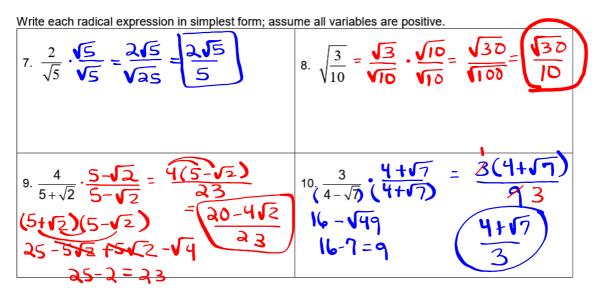
Properties of Radicals

Product Property
$$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$$
 Quotient Property $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

I. A square root expression is written in simplest form when the radicand has no perfect square factors.



II. A radical expression with index or root *n* is written in simplest form when there are no radicals in the denominator (rationalize the denominator).



Simplifying Radicals Additional Practice Show work as needed on a separate sheet of paper; copy your answer onto this sheet.

RADICALS ARE IN SIMPLEST FORM WHEN...

- ☼ NO perfect square factors other than 1 are under the radical.
- ★ NO fractions are under the radical
- ♦ NO radicals are in the denominator

3.
$$-4\sqrt{40}$$
 - $8\sqrt{10}$

4.
$$\sqrt{2}(3\sqrt{14}-\sqrt{7})$$
 6 $\sqrt{7}$ - $\sqrt{14}$ 3 $\sqrt{28}$ - $\sqrt{14}$ 3.2 $\sqrt{7}$ - $\sqrt{14}$

6.
$$\sqrt{7}(3-2\sqrt{7}) - 14+3\sqrt{7}$$
 $3\sqrt{7} - 2\sqrt{49}$ at $\sqrt{6}$
 $3\sqrt{7} - 2(7)$
 $3\sqrt{7} - 14$

7.
$$\sqrt{\frac{5}{15}}$$
 $\frac{\sqrt{3}}{3}$

8.
$$\sqrt{\frac{250}{2}}$$
 5 $\sqrt{5}$

9.
$$\frac{7}{6-\sqrt{2}}$$
 $\frac{42+7\sqrt{2}}{34}$

10.
$$\frac{2}{3+\sqrt{5}}$$
 $\frac{3-\sqrt{5}}{2}$

11.
$$2\sqrt{45} - 2\sqrt{5}$$
 4\5
2\2\3\5-2\5

12.
$$3\sqrt{18} + 3\sqrt{12} + 2\sqrt{27}$$

$$\frac{7}{6-\sqrt{2}} \cdot \frac{6+\sqrt{2}}{6+\sqrt{2}} = \frac{7(6+\sqrt{2})}{34} \cdot \frac{42+72}{34} = \frac{42}{34} + \frac{7\sqrt{2}}{34} = \frac{42}{34} + \frac{7\sqrt{2}}{34} = \frac{36-\sqrt{4}}{36-2} = \frac{21}{34} + \frac{7\sqrt{2}}{34} = \frac{21}{34} + \frac{21}{34} = \frac{21}{34} + \frac{21}{34} = \frac{21}{34} + \frac{21}{34} = \frac{21}{34} = \frac{21}{34} + \frac{21}{34} = \frac{$$