MATH 123 **Exponents and Radicals**

1. Simplify each expression to lowest terms using only positive exponents.

$\left(xy^{-4}\right)^{-1}$

$-\dfrac{3ab^2}{\left(9a^2b^4\right)^3}$

$\left(\dfrac{2ab^{-1}}{ab}\right)^{-1}\left(\dfrac{3a^{-2}b}{a^2b^2}\right)^{-2}$

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

$\left(\dfrac{9ab^2}{8a^{-2}b}\right)^{-2}\left(\dfrac{3a^{-2}b}{2a^2b^{-2}}\right)^3$

2. True or False: $(a+b)^2 = a^2 + b^2$ Explain how you made your decision.

3. Simplify to lowest terms using nonnegative exponents, as needed.

$\sqrt{x^4y^3z^5}$

$\sqrt{496}$

$\sqrt{18b^3} + \sqrt{75b^3}$

$\sqrt[3]{-16} - \sqrt[3]{54}$

$\sqrt{12} + \sqrt{27} - \sqrt{48}$

$2a\sqrt{27ab^5} + 3b\sqrt{3a^3b}$

$\sqrt[3]{-128}$

$-\dfrac{1}{\sqrt[3]{16}} - \dfrac{5}{\sqrt[3]{128}} + \dfrac{4}{\sqrt[3]{2}}$

4. Perform the indicated operation and simplify to lowest terms.

$\left(\sqrt{2}+4\right)\left(\sqrt{2}-4\right)$

$\left(\sqrt{3}+2\right)\left(5-\sqrt{3}\right)$

5. Rationalize the denominator and simplify to lowest terms.

$\dfrac{2}{\sqrt{5}}$

$\dfrac{3+\sqrt{5}}{4+\sqrt{8}}$

$\dfrac{3}{1-\sqrt{7}}$

$\left(\sqrt{5}+\sqrt{3}\right)^{-1}$

6. Rationalize the numerator and simplify to lowest terms.

$\sqrt{2}$

$2-\sqrt{3}$

$\dfrac{3+\sqrt{7}}{2}$

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

$\dfrac{\sqrt{3}+2}{5}$

7. Each fraction contains a common factor of h in the numerator and the denominator. Change the form of the fraction so that you can reduce the numerator and denominator by h and simplify to lowest terms.

$\dfrac{\sqrt{x+h}-\sqrt{x}}{h}$

$\dfrac{\dfrac{1}{x+h}-\dfrac{1}{x}}{h}$

$\dfrac{\dfrac{1}{\sqrt{x+h}}-\dfrac{1}{\sqrt{x}}}{h}$