MATH 123 **Exponents and Radicals**

1. Simplify completely, expressing the solution using only positive exponents.

$\left(xy^{-4}\right)^{-1}$ $\qquad -\dfrac{3ab^2}{\left(9a^2b^4\right)^3}$ $\qquad \left(\dfrac{2ab^{-1}}{ab}\right)^{-1}\left(\dfrac{3a^{-2}b}{a^2b^2}\right)^{-2}$

$\left(x^{-1}y^2\right)^{-3}\left(x^2y^{-4}\right)^{-3}$ $\qquad \left(\dfrac{9ab^2}{8a^{-2}b}\right)^{-2}\left(\dfrac{3a^{-2}b}{2a^2b^{-2}}\right)^3$

2. True or False: $\sqrt{a+b}=\sqrt{a}+\sqrt{b}$ Explain how you made your decision.

3. Simplify completely.

$\sqrt{x^4y^3z^5}$ $\qquad \sqrt{496}$

$\sqrt{18b^3}+\sqrt{75b^3}$ $\qquad \sqrt[3]{-16}-\sqrt[3]{54}$

$\sqrt{12}+\sqrt{27}-\sqrt{48}$ $\qquad 2a\sqrt{27ab^5}+3b\sqrt{3a^3b}$

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

4. Perform the indicated operation and simplify completely.

$\left(\sqrt{2}+4\right)\left(\sqrt{2}-4\right)$ $\qquad \left(\sqrt{3}+2\right)\left(5-\sqrt{3}\right)$

5. Rationalize the denominator.

$\dfrac{2}{\sqrt{5}}$ $\qquad \dfrac{3+\sqrt{5}}{4+\sqrt{8}}$

$\dfrac{3}{1-\sqrt{7}}$ $\qquad \left(\sqrt{5}+\sqrt{3}\right)^{-1}$

6. Rationalize the numerator.

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

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

7. Simplify completely.

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