Name: _____ Date: _____

5-1 RATIONAL EXPONENTS
MATH III HOMEWORK

FLUENCY

1. Rewrite the following as equivalent roots and then evaluate as many as possible **without your calculator.**

(a) $36^{1/2}$ (b) $27^{1/3}$ (c) $32^{1/5}$ (d) $100^{-1/2}$

(e) $625^{1/4}$ (f) $49^{1/2}$ (g) $81^{-1/4}$ (h) $343^{1/3}$

2. Evaluate each of the following by considering the root and power indicated by the exponent. Do as many as possible **without your calculator**.

(a) $8^{2/3}$ (b) $4^{3/2}$ (c) $16^{-3/4}$ (d) $81^{5/4}$

(e) $4^{-5/2}$ (f) $128^{3/7}$ (g) $625^{3/4}$ (h) $243^{3/5}$

3. Given the function $f(x)=5(x+4)^{3/2}$, which of the following represents its *y*-intercept?

(1) 40 (3) 4

(2) 20 (4) 30

4. Which of the following is equivalent to $x^{-1/2}$?

(1) $-\frac{1}{2}x$ (3) $\frac{1}{\sqrt{x}}$

(2) $-\sqrt{x}$ (4) $-\frac{1}{2x}$ _____

5. Written without fractional or negative exponents, $x^{-3/2}$ is equal to

(1) $-\frac{3x}{2}$ (3) $\frac{1}{\sqrt{x^3}}$

(2) $\frac{1}{\sqrt[3]{x^2}}$ (4) $-\frac{1}{\sqrt{x}}$ _____

6. Which of the following is *not* equivalent to $16^{3/2}$?

(1) $\sqrt{4096}$ (3) 64

(2) 8^3 (4) $\sqrt{16^3}$ _____

REASONING

7. Marlene claims that the square root of a cube root is a sixth root? Is she correct? To start, try rewriting the expression below in terms of fractional exponents. Then apply the **Product Property of Exponents**.

$\sqrt{\sqrt[3]{a}}$

8. We should know that $\sqrt[3]{8}=2$. To see how this is equivalent to $8^{1/3}=2$ we can solve the equation $8^n=2$. To do this, we can rewrite the equation as:

$$\left(2^3\right)^n=2^1$$

How can we now use this equation to see that $8^{1/3}=2$?