Student: _____ **Date:** _____	**Instructor:** Ray Brown **Course:** FRCC MAT 055.609 Algebraic Literacy 1930	**Assignment:** Unit 3 Homework: Section 10.5_10.1 IR

1. Simplify by factoring. Assume that all variables under radicals represent nonnegative numbers.

   $$\sqrt{x^{12}}$$

   Select the correct choice below and, if necessary, fill in the answer box that completes your choice.

   ○ **A.** $\sqrt{x^{12}} =$ _____
   (Type an exact answer, using radicals as needed.)
   ○ **B.** The square root is not a real number.

2. Find the cube root.

   $$\sqrt[3]{x^{51}}$$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $\sqrt[3]{x^{51}} =$ _____ (Simplify your answer.)
   ○ **B.** The root is not a real number.

3. Find the cube root.

   $$\sqrt[3]{-27x^{21}}$$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $\sqrt[3]{-27x^{21}} =$ _____ (Simplify your answer.)
   ○ **B.** The root is not a real number.

4. Simplify. If an expression does not represent a real number, state so.

   $$\sqrt[4]{-16}$$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $\sqrt[4]{-16} =$ _____ (Type an integer.)
   ○ **B.** The root is not a real number.

5. Simplify the radical. Assume that the variable represents a positive real number.

$$\sqrt[4]{\dfrac{x^8}{81}}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $\sqrt[4]{\dfrac{x^8}{81}} =$ _____

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

○ **B.** The radical does not represent a real number.

6. Use radical notation to write the expression. Simplify, if possible.

$$16^{1/4}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $16^{1/4} =$ _____ (Simplify your answer. Type an exact answer, using radicals as needed.)

○ **B.** The answer is not a real number.

7. Use radical notation to write the expression. Simplify if possible. Assume that all variables represent nonnegative quantities.

$$\left(25x^8\right)^{\frac{1}{2}}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $\left(25x^8\right)^{\frac{1}{2}} =$ _____

(Simplify your answer. Type an exact answer, using radicals as needed.)

○ **B.** The answer is not a real number.

8. Use radical notation to write the expression. Simplify if possible.

$$-25^{\frac{1}{2}}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $-25^{\frac{1}{2}} =$ _____

(Type an exact answer, using radicals as needed. Simplify your answer.)

○ **B.** The answer is not a real number.

9. Use radical notation to write the expression. Simplify if possible. Assume that all variables represent positive real numbers.

$$(5x + 2)^{\frac{3}{4}}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $(5x + 2)^{\frac{3}{4}} = $ _____
    (Simplify your answer. Type an exact answer, using radicals as needed.)

○ **B.** The answer is not a real number.

10. Use rational exponents to simplify the expression. Assume that all variables represent positive numbers.

$$\sqrt[9]{a^6 s^3}$$

$\sqrt[9]{a^6 s^3} = $ _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

11. Use rational exponents to write as a single radical expression. Assume that all variables represent positive real numbers.

$$\sqrt[4]{y} \cdot \sqrt[5]{y^2}$$

$\sqrt[4]{y} \cdot \sqrt[5]{y^2} = $ _____

12. Simplify the expression by first converting to rational exponents. Assume that all variables represent positive real numbers.

$$\frac{\sqrt[5]{x^2}}{\sqrt[6]{x^2}}$$

The simplified form is _____ .
(Type an exact answer, using radicals as needed.)

13. Use the product rule to multiply. Assume that all variables represent positive real numbers.

$$\sqrt{6} \cdot \sqrt{7x}$$

$\sqrt{6} \cdot \sqrt{7x} = $ _____
(Type an exact answer, using radicals as needed. Simplify your answer.)

14. Simplify. Assume that all variables represent positive real numbers.

$$\sqrt[3]{108x^4}$$

$\sqrt[3]{108x^4} = $ _____
(Type an exact answer, using radicals as needed. Simplify your answer.)

15. Simplify. Assume that the variables represent nonnegative real numbers.

$$\sqrt{64a^6b^3}$$

$\sqrt{64a^6b^3} = $ _____ (Type an exact answer, using radicals as needed.)

16. Use the quotient rule to divide. Then simplify if possible. Assume that all variables represent positive real numbers.

$$\frac{\sqrt[4]{96a^{10}b^5}}{\sqrt[4]{3a^2b^5}}$$

$\dfrac{\sqrt[4]{96a^{10}b^5}}{\sqrt[4]{3a^2b^5}} = $ _____

(Type an exact answer, using radicals as needed. Simplify your answer.)

17. Add or subtract.

$$6\sqrt{27} - 2\sqrt{18} + \sqrt{75}$$

$6\sqrt{27} - 2\sqrt{18} + \sqrt{75} = $ _____
(Simplify your answer. Type an exact answer, using radicals as needed.)

18. Add and subtract. Assume that all variables represent positive real numbers.

$$\sqrt{4b^3} + \sqrt{81b^3} - \sqrt{100b^3}$$

$\sqrt{4b^3} + \sqrt{81b^3} - \sqrt{100b^3} = $ _____
(Simplify your answer. Type an exact answer, using radicals as needed.)

19. Multiply, and then simplify if possible.

$$\sqrt{10}\left(\sqrt{3} + \sqrt{11}\right)$$

$\sqrt{10}\left(\sqrt{3} + \sqrt{11}\right) = $ _____
(Simplify your answer. Type an exact answer, using radicals as needed.)

20. Multiply, and then simplify if possible.

$$\left(\sqrt{6} - \sqrt{5}\right)^2$$

$\left(\sqrt{6} - \sqrt{5}\right)^2 = $ _____
(Simplify your answer. Do not factor. Type an exact answer, using radicals as needed.)

21. Multiply. Assume that all variables represent positive real numbers.

$$\left(\sqrt{u} - k\right)\left(\sqrt{u} + k\right)$$

$\left(\sqrt{u} - k\right)\left(\sqrt{u} + k\right) = $ _____   (Simplify your answer.)

22. Multiply and then simplify if possible.

$$\left(\sqrt{x-5}+7\right)^2$$

$\left(\sqrt{x-5}+7\right)^2 =$ _____

(Simplify your answer. Type an exact answer, using radicals as needed.)

23. Rationalize the denominator. Assume that all variables represent positive real numbers.

$$\sqrt{\dfrac{16}{x}}$$

$\sqrt{\dfrac{16}{x}} =$ _____ (Type an exact answer, using radicals as needed.)

24. Rationalize the denominator of $\dfrac{4}{\sqrt[3]{3}}$.

$\dfrac{4}{\sqrt[3]{3}} =$ _____ (Type an exact answer, using radicals as needed.)

25. Rationalize the denominator. Assume that all variables represent positive real numbers.

$$\dfrac{4}{\sqrt[3]{9x^2}}$$

$\dfrac{4}{\sqrt[3]{9x^2}} =$ _____ (Type an exact answer, using radicals as needed.)

26. Rationalize the denominator.

$$\dfrac{5\sqrt{2}+\sqrt{6}}{10\sqrt{2}-\sqrt{6}}$$

$\dfrac{5\sqrt{2}+\sqrt{6}}{10\sqrt{2}-\sqrt{6}} =$ _____

(Simplify your answer. Type an exact answer, using radicals as needed.)

1. A. $\sqrt{x^{12}}$ = ___**x**^{6}___ (Type an exact answer, using radicals as needed.)

2. A. $\sqrt[3]{x^{51}}$ = ___**x**^{17}___ (Simplify your answer.)

3. A. $\sqrt[3]{-27x^{21}}$ = ___**− 3x**^{7}___ (Simplify your answer.)

4. B. The root is not a real number.

5. A. $\sqrt[4]{\dfrac{x^8}{81}}$ = ___$\dfrac{\mathbf{x^2}}{\mathbf{3}}$___ (Simplify your answer. Use integers or fractions for any numbers in the expression.)

6. A. $16^{1/4}$ = ___**2**___ (Simplify your answer. Type an exact answer, using radicals as needed.)

7. A. $\left(25x^8\right)^{\frac{1}{2}}$ = ___**5x**^{4}___ (Simplify your answer. Type an exact answer, using radicals as needed.)

8. A. $-25^{\frac{1}{2}}$ = ___**− 5**___ (Type an exact answer, using radicals as needed. Simplify your answer.)

9. A. $(5x + 2)^{\frac{3}{4}}$ = ___$\sqrt[4]{\mathbf{(5x + 2)^3}}$___ (Simplify your answer. Type an exact answer, using radicals as needed.)

10. $\sqrt[3]{a^2 s}$

11. $\sqrt[20]{y^{13}}$

12. $\sqrt[15]{x}$

13. $\sqrt{42x}$

14. $3x\sqrt[3]{4x}$

15. $8a^3 b\sqrt{b}$

16. $2a^2 \sqrt[4]{2}$

17. $23\sqrt{3} - 6\sqrt{2}$

18. $1b\sqrt{b}$

19. $\sqrt{30} + \sqrt{110}$

20. $11 - 2\sqrt{30}$

21. $u - k^2$

22. $x + 44 + 14\sqrt{x-5}$

23. $\dfrac{4\sqrt{x}}{x}$

24. $\dfrac{4\sqrt[3]{9}}{3}$

25. $\dfrac{4\sqrt[3]{3x}}{3x}$

26. $\dfrac{53 + 15\sqrt{3}}{97}$