

HW 9-2

Quiz Today on Days 1 & 2

1. $\sqrt{3}$

6. $6(2x)^{\frac{1}{2}}$

11. $\frac{2}{3}$

16. $\frac{3}{2}$

2. $\sqrt[5]{11}$

7. $\frac{1}{16}$

12. $\frac{x}{20}$

17. $x^{\frac{1}{2}}$

3. $\sqrt[4]{2x}$

8. $-\frac{8}{125}$

13. 3

18. $x^{\frac{1}{12}}$

4. $(3x)^{\frac{1}{4}}$

9. -3

14. 2

19. x

5. $3x^{\frac{1}{4}}$

10. $-2x$

15. $\frac{1}{7}$

20. $18x^2$

$f(-1/2) = \frac{9}{2}$

Nov 23-7:18 PM

Name _____

Alg 2 HW 9-2

Rewrite each exponential expression as an nth root.

1. $3^{\frac{1}{2}} = \sqrt{3}$

2. $11^{\frac{1}{5}} = \sqrt[5]{11}$

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

Write using exponents.

4. $\sqrt[4]{3x} = (3x)^{\frac{1}{4}}$

5. $3\sqrt[4]{x} = 3x^{\frac{1}{4}}$

6. $6\sqrt{2x} = 6(2x)^{\frac{1}{2}}$

$(3x)^{\frac{1}{4}} = \sqrt[4]{3x}$

Nov 23-7:21 PM

Simplify each expression (positive exponents only). No calculators!

7. $(-4)^{-2} = \frac{1}{(-4)^2} = \frac{1}{16}$

8. $\left(-\frac{5}{2}\right)^{-3} = \left(-\frac{2}{5}\right)^3 = -\frac{8}{125}$

9. $(-27)^{\frac{1}{3}} = \sqrt[3]{(-27)} = -3$

10. $\frac{-10x^{-2}}{5x^{-3}} = \frac{-2x^3}{x^2} = -2x$

11. $\left(\frac{8}{27}\right)^{\frac{1}{3}} = \sqrt[3]{\frac{8}{27}} = \frac{2}{3}$

12. $\frac{(2x)^{-2}}{5x^{-3}} = \frac{x^3}{5(2x)^2} = \frac{x^3}{5 \cdot 4x^2} = \frac{x}{20}$

Nov 23-7:21 PM

Evaluate

13. $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

14. $16^{\frac{1}{4}} = \sqrt[4]{16} = 2$

15. $49^{-\frac{1}{2}} = \frac{1}{\sqrt{49}} = \frac{1}{7}$

16. $\left(\frac{8}{27}\right)^{-\frac{1}{3}} = \left(\frac{27}{8}\right)^{\frac{1}{3}} = \sqrt[3]{\frac{27}{8}} = \frac{3}{2}$

Use the properties of exponents to evaluate the following expressions.

17. $x^{\frac{1}{3}} \cdot x^{\frac{1}{6}} = x^{\frac{1}{3} + \frac{1}{6}} = x^{\frac{2}{6} + \frac{1}{6}} = x^{\frac{3}{6}} = x^{\frac{1}{2}}$

18. $\frac{x^{\frac{1}{4}}}{x^{\frac{1}{6}}} = x^{\frac{1}{4} - \frac{1}{6}} = x^{\frac{3}{12} - \frac{2}{12}} = x^{\frac{1}{12}}$

19. $\left(x^{\frac{1}{4}}\right)^4 = x^{\frac{1}{4} \cdot 4} = x$

Use the properties of exponents to rewrite the expression with positive exponents and evaluate for the given value.

20. $\frac{2}{(3x)^{-2}} = 2 \cdot (3x)^2 = 2 \cdot 9x^2 = 18x^2$

Find $f(-1/2)$
 $= 18(-\frac{1}{2})^2 = 18(\frac{1}{4}) = \frac{18}{4} = \frac{9}{2}$

Nov 23-7:22 PM

More Negative and Fractional Exponents

Nov 18-5:22 PM

$$\begin{array}{l}
 x^{1/3} = \sqrt[3]{x} \\
 \hline
 (x^{1/3})^2 = (\sqrt[3]{x})^2 \\
 \hline
 (x^2)^{1/3} = \sqrt[3]{x^2} \\
 \hline
 (x^3)^2 = x^6
 \end{array}
 \quad
 \begin{array}{l}
 \frac{1}{3} \cdot \frac{2}{1} = \frac{2}{3} \\
 \left(x^{1/3} \right)^2 = x^{2/3} = (\sqrt[3]{x})^2 \\
 \left(x^2 \right)^{1/3} = x^{2/3} = \sqrt[3]{x^2}
 \end{array}
 \quad
 \left[\quad \right] =$$

More Negative and Fractional Exponents

Unit 9 Day 3

Rule: $x^{\frac{m}{n}} = (\sqrt[n]{x})^m$ or $x^{\frac{m}{n}} = (\sqrt[n]{x^m})$

$x^{-\frac{m}{n}} = \frac{1}{(\sqrt[n]{x})^m}$ or $x^{-\frac{m}{n}} = \frac{1}{(\sqrt[n]{x^m})}$

reciprocate
the base
(not the exponent!)

$$4^3 = 64$$

$$\sqrt[3]{64} = 4$$

$$8^2 = 64 \rightarrow \sqrt[3]{64} = 8$$

Rewrite each of the following without the use of fractional exponents.

$$8^{\frac{2}{3}} = (\sqrt[3]{8})^2 = 2^2 = 4$$

$$= \sqrt[3]{8^2} = \sqrt[3]{64} = 4$$

$$4x^{\frac{6}{5}} = 4\sqrt[5]{x^6}$$

$$4(\sqrt[5]{x})^6$$

Rewrite each of the following without the use of fractional or negative exponents.

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

$$x^{-\frac{4}{3}} = \frac{1}{x^{\frac{4}{3}}} = \frac{1}{\sqrt[3]{x^4}} \text{ or } \frac{1}{(\sqrt[3]{x})^4}$$

Rewrite each expression in exponential form.

$$\sqrt[3]{x} = x^{\frac{1}{3}}$$

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

16 simplify

$$x^1 y^{\frac{3}{2}} = x\sqrt{y^3}$$

Nov 18-5:19 PM

Evaluate

1. $27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$

2. $8^{-\frac{2}{3}} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{8})^2} = \frac{1}{2^2} = \frac{1}{4}$

3. $16^{\frac{3}{4}} = (\sqrt[4]{16})^3 = 2^3 = 8$

4. $\left(\frac{4}{25}\right)^{-\frac{3}{2}} = \left(\frac{25}{4}\right)^{\frac{3}{2}} = \left(\sqrt{\frac{25}{4}}\right)^3 = \left(\frac{5}{2}\right)^3 = \frac{125}{8}$

5. $(4a^0)^{\frac{3}{2}} = (4 \cdot 1)^{\frac{3}{2}} = 4^{\frac{3}{2}}$
 $= (\sqrt{4})^3 = 8$

6. $\left(\frac{125}{64}\right)^{-\frac{2}{3}} = \left(\frac{64}{125}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\frac{64}{125}}\right)^2 = \left(\frac{4}{5}\right)^2 = \frac{16}{25}$

Nov 18-5:20 PM

$$7. \left(\frac{1}{4}\right)^{-\frac{1}{2}} = 4^{\frac{1}{2}} = \sqrt{4} = \boxed{2}$$

$$8. (-27)^{\frac{4}{3}} = (\sqrt[3]{-27})^4 = (-3)^4 = \boxed{81}$$

$$9. \left(\frac{8}{9}\right)^{-\frac{2}{3}} = \left(\frac{9^3}{8^3}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\frac{9^3}{8^3}}\right)^2 = \left(\frac{9}{2}\right)^2 = \frac{81}{4}$$

$P \neq M \neq S$

10. If $h(x) = 4x^{-\frac{1}{5}}$, find $h(32)$

$$= 4(32)^{-\frac{1}{5}} = 4\left(\frac{1}{32}\right)^{\frac{1}{5}} = 4\sqrt[5]{\frac{1}{32}} = 4\left(\frac{1}{2}\right) = \boxed{2}$$

Nov 18-5:20 PM

11. If the function $g(x) = 4x^{-\frac{1}{2}}$, find the value of $g(36)$.

$$= 4(36)^{-\frac{1}{2}} = 4\left(\frac{1}{36^{\frac{1}{2}}}\right) = 4\left(\frac{1}{6}\right) = \frac{4}{6} = \boxed{\frac{2}{3}}$$

Nov 18-5:20 PM

Using the Laws of Exponents, solve for y .

12. $\frac{x^{\frac{8}{5}}}{x^{\frac{3}{5}}} = x^y$

$$x^1 = x^y$$

$$y = 1$$

13. $\frac{x^{\frac{3}{7}} x^{\frac{2}{7}}}{(x^2)^{\frac{3}{14}}} = x^y$

$$\frac{x^{(\frac{3}{7} + \frac{2}{7})}}{x^{(\frac{6}{14})}} = x^y$$

$$x^{10/14 - 6/14} = x^y$$

$$x^{4/14} = x^y$$

$$y = \frac{2}{7}$$

14. $\frac{\sqrt[3]{x^9}}{(x^3)^{\frac{1}{4}}} = x^y$

$$\frac{x^{9/3}}{x^{3/4}} = x^y$$

$$x^{6/4} = x^y$$

$$y = \frac{3}{2}$$

15. $\frac{\sqrt[5]{x^2} \sqrt[3]{x^2}}{\sqrt[12]{x^2}} = x^y$

$$= \frac{x^{2/5} \cdot x^{2/3}}{x^{2/12}} = x^y$$

$$x^{2/5 + 2/3 - 2/12} = x^y$$

$$x^{6/15 + 4/15 - 2/12} = x^y$$

$$x^{10/15 - 2/12} = x^y$$

$$x^{10/12 - 2/12} = x^y$$

$$x^{8/12} = x^y$$

$$y = \frac{2}{3}$$