Math 10C Roots and Powers Review   Name: _____

1.   Find the value of each of the following. Express answers in $\frac{a}{b}$ form: **SHOW WORK**

a. $-3^2 =$

b. $\left(\frac{3}{4}\right)^{-4} =$

c. $64^{\frac{5}{6}} =$

d. $27^{-\frac{2}{3}} =$

e. $\left(\frac{125}{216}\right)^{\frac{2}{3}}$

f. $49^{3/2} =$

2.   Simplify:

a. $-m^2 n^{-3} m^3 n m^{-2}$

b. $\frac{10a^5 b^3}{2a^2 b^{-2}}$

c. $\left(\frac{12x^5 y^3 z^4}{18x^4 y^6 z^{-2}}\right)^2 =$

d. $\left(\frac{6x^{-2}}{xy^2}\right)\left(\frac{3x^2 y^{-1}}{xy^{-2}}\right)^{-2} =$

3. Express each radical in mixed radical form:

    a. $\sqrt[3]{54} =$ b. $\sqrt{75} =$

    c. $\sqrt[3]{375} =$ d. $\sqrt{147} =$

4. Express each of the following in a entire radical form:

    a. $3\sqrt{5} =$ b. $-2\sqrt[3]{3} =$

5. Tell whether each number is a rational or irrational.

    $a.-\dfrac{3}{5}$ $b.\sqrt{14}$ $c.\sqrt[3]{\dfrac{8}{27}}$

Date: _____

Name: _____

1. $(49\,a^4b^2)^{\frac{1}{2}}$

2. $(-27a^3b^6)^{\frac{1}{3}}$

3. $\left(\dfrac{4p^8q^{-2}}{9\,p^4q^4}\right)^{\frac{1}{2}}$

4. $\left(\dfrac{18x^2y^4}{2x^4y^8}\right)^{\frac{1}{2}}$

5. $\left(2p^{\frac{3}{4}}q^{\frac{-5}{3}}\right)\left(-3p^{\frac{-7}{4}}q^{\frac{11}{3}}\right)$

6. $\left(x^3y^{\frac{-3}{2}}\right)\left(x^{-1}y^{\frac{1}{2}}\right)$

7. $\left(\dfrac{-1}{3}\right)^{\frac{4}{6}} \left(\dfrac{-1}{3}\right)^{\frac{4}{3}}$

8. A cube has a volume of $432 \ cm^3$. Write the edge length of the cube as radical in simplest form. $V = lwh \ \ or \ V = l^3$ Express your answer as $a\sqrt{b}$.

9. Determine the **edge length** of a square that has an area of $162 \ cm^2$. Express your answer as a mixed radical in lowest terms. $A = l^2$

Math 10C Roots and Powers Review   Name: __KEY_____

1.   Find the value of each of the following. Express answers in $\frac{a}{b}$ form: **SHOW WORK**

a. $-3^2 = -9$

b. $\left(\dfrac{3}{4}\right)^{-4} = \left(\dfrac{4}{3}\right)^4$

$\dfrac{256}{81}$

c. $64^{5/6} = \left(\sqrt[6]{64}\right)^5$

$(2)^5$

32

d. $27^{-2/3} =$

$\left(\sqrt[3]{27}\right)^2$ [with $\frac{1}{}$ over it]

$\dfrac{1}{(3)^2} = \dfrac{1}{9}$

e. $\left(\dfrac{\overset{125}{\cancel{16}}}{\underset{216}{\cancel{54}}}\right)^{2/3} =$

$\dfrac{\left(\sqrt[3]{125}\right)^2}{\left(\sqrt[3]{216}\right)^2} = \dfrac{(5)^2}{(6)^2}$

$\dfrac{25}{36}$

f. $\overset{49}{\cancel{24}}{}^{3/2} =$

$\left(\sqrt[2]{49}\right)^3$

$(7)^3 = 343$

2.   Simplify:

a. $-m^2 n^{-3} m^3 n m^{-2}$

$-m^3 n^{-2}$

$-\dfrac{m^3}{n^2}$

b. $\dfrac{10a^5 b^3}{2a^2 b^{-2}}$

$5a^3 b^5$

c. $\left(\dfrac{12x^5 y^3 z^4}{18x^4 y^6 z^{-2}}\right)^2 =$

$\left(\dfrac{2x y^{-3} z^6}{3}\right)^2$

$\dfrac{4x^2 y^{-6} z^{12}}{9}$

$\dfrac{4x^2 z^{12}}{9y^6}$

d. $\left(\dfrac{6x^{-2}}{xy^2}\right)\left(\dfrac{3x^2 y^{-1}}{xy^{-2}}\right)^{-2} =$

$\left(\dfrac{6}{x^3 y^2}\right)\left(\dfrac{3xy}{1}\right)^{-2}$

$\left(\dfrac{6}{x^3 y^2}\right)\left(\dfrac{1}{3xy}\right)^2$

$\boxed{\dfrac{2}{3x^5 y^4}}$

$\left(\dfrac{6}{x^3 y^2}\right)\left(\dfrac{1}{9x^2 y^2}\right) = \dfrac{6}{9x^5 y^4}$

3. Express each radical in mixed radical form:

a. $\sqrt[3]{54} =$

$\sqrt[3]{27} \times \sqrt[3]{2}$

$3\sqrt[3]{2}$

b. $\sqrt{75} =$

$\sqrt{25} \times \sqrt{3}$

$5\sqrt{3}$

c. $\sqrt[3]{375} =$

$\sqrt[3]{125} \times \sqrt[3]{3}$

$5\sqrt[3]{3}$

d. $\sqrt{147} =$

$\sqrt{49} \times \sqrt{3}$

$7\sqrt{3}$

4. Express each of the following in a entire radical form:

a. $3\sqrt{5} =$

$\sqrt{3 \times 3} \times \sqrt{5}$

$\sqrt{9} \times \sqrt{5}$

$\sqrt{45}$

b. $-2\sqrt[3]{3} =$

$\sqrt[3]{-2 \times -2 \times -2} \times \sqrt[3]{3}$

$\sqrt[3]{-8} \times \sqrt[3]{3}$

$\sqrt[3]{-24}$

5. Tell whether each number is a rational or irrational.

a. $-\dfrac{3}{5}$

Q

b. $\sqrt{14}$

$\overline{Q}$

c. $\sqrt[3]{\dfrac{8}{27}}$

Q

Date: _____

Name: _____

1. $(49\,a^4b^2)^{\frac{1}{2}}$

$\sqrt{49}\ a^2b$

$7a^2b$

2. $(-27a^3b^6)^{\frac{1}{3}}$

$\sqrt[3]{-27}$

$-3ab^2$

3. $\left(\dfrac{4p^8q^{-2}}{9\,p^4q^4}\right)^{\frac{1}{2}}$

$\dfrac{4}{9}p^4q^{-6}$

$\dfrac{\sqrt{4}}{\sqrt{9}}$ $\left(\dfrac{4\,p^4}{9\,q^6}\right)^{\frac{1}{2}}$

$\dfrac{2p^2}{3\,q^3}$

4. $\left(\dfrac{18x^2y^4}{2x^4y^8}\right)^{\frac{1}{2}}$

$\left(9x^{-2}y^{-4}\right)^{\frac{1}{2}}$

$\left(\dfrac{9}{x^2\,y^4}\right)^{\frac{1}{2}}$

$\dfrac{3}{x\,y^2}$

5. $\left(2p^{\frac{3}{4}}q^{\frac{-5}{3}}\right)\left(-3p^{\frac{-7}{4}}q^{\frac{11}{3}}\right)$

$-6p^{\frac{-4}{4}}q^{\frac{6}{3}}$

$-6p^{-1}q^2$

$\dfrac{-6q^2}{p}$

6. $\left(x^3y^{\frac{-3}{2}}\right)\left(x^{-1}y^{\frac{1}{2}}\right)$

$x^2y^{\frac{-2}{2}}$

$\dfrac{x^2}{y}$

7. $\left(\dfrac{-1}{3}\right)^{\frac{4}{6}} \left(\dfrac{-1}{3}\right)^{\frac{4}{3}}$

$-\dfrac{1}{9}$

8. A cube has a volume of $432\ cm^3$. Write the edge length of the cube as radical in simplest form. $V = lwh\ or\ V = l^3$ Express your answer as $a\sqrt{b}$.

$\sqrt[3]{432}$

$\wedge$

$\sqrt[3]{216} \times \sqrt[3]{2}$

$6\sqrt[3]{2}$

9. Determine the **edge length** of a square that has an area of 162 cm². Express your answer as a mixed radical in lowest terms. $A = l^2$

$\sqrt{162}$

$\wedge$

$\sqrt{81} \times \sqrt{2}$

$9\sqrt{2}$