Rational Exponents

Hw #
Omega 1A

Evaluate.

#1) $3^{-4} \cdot 3^{8}$	#2) $\left(5^{\frac{3}{4}}\right)^{4}$	#3) $\left(8^{\frac{-1}{2}}\right)^{\frac{-2}{3}}$
#4) $(3^{-1} + 3^{-2})^{-1}$	#5) $\dfrac{16^{\frac{3}{4}}}{16^{\frac{1}{4}}}$	#6) $\dfrac{27}{27^{\frac{2}{3}}}$

Express using rational exponent.

#7) $\sqrt[6]{b^{3}}$	#8) $\sqrt[3]{125a^{2}b^{3}}$	#9) $\sqrt[4]{24a^{12}b^{16}}$
#10) $\sqrt[5]{32x^{5}y^{8}}$	#11) $64^{\frac{1}{6}}$	#12) $4^{\frac{1}{3}}a^{\frac{2}{3}}y^{\frac{4}{3}}$

Rational Exponents

Express using radicals.

#13) $\left(rt^2\right)^{\frac{1}{5}} v^{\frac{3}{5}}$

#14) $\dfrac{x^{\frac{2}{3}}}{x^{\frac{1}{3}}}$

#15) $\left(x^{10} y^2\right)^{\frac{1}{5}} a^{\frac{2}{5}}$

Simplify.

#16) $x^6 \bullet x^3 \bullet x^2$

#17) $\left(5x^{\frac{1}{3}}\right)^3$

#18) $\left(4y^4\right)^{\frac{3}{2}}$

#19) $\left(a^{\frac{1}{2}} b^{-2} c^{\frac{5}{4}}\right)^{-4}$

#20) $\dfrac{3^{60}}{9^{30}}$

Rational Exponents

Hw #
Omega 1A

Word Problems.

21) Mathematicians have shown that a soap bubble will enclose a maximum space with a minimum amount of material. Architects have used this property to create buildings that enclose a great about of space while using a small amount of material. If a soap bubble has a surface area of A, then its volume, V, is given by the equation $V = 0.094\sqrt{A^3}$. Find the surface area of a bubble with a volume of 7.5 cm^3.

22) The typical period of the orbit of a space shuttle around Earth is approximately 90 minutes. The radius of Earth is approximately 6400 km. Use the formula $r = \sqrt[3]{\frac{GM_e t^2}{4\pi^2}}$, where r represents the distance in meters from the center of Earth to the satellite, G = 6.67 x 10^{-11} kg, t represents the time in seconds, and M_e represents the mass of Earth, which is 5.98 x 10^{24} kg, to determine how far the space shuttle is above Earth.

23) All matter is composed of atoms. The nucleus of an atom is the center portion of the atom that contains most of the mass of the atom. A theoretical formula for the radius, r, of the nucleus of an atom is r = (1.3 x 10^{-15})$A^{1/3}$ meters, where A is the mass number of the nucleus. Find the radius of the nucleus, if the mass number of an isotope of carbon is 12.

Rational Exponents

1) 81
2) 125
3) 2
4) $\frac{9}{4}$
5) 4
6) 3
7) $b^{\frac{1}{2}}$
8) $5a^{\frac{2}{3}}b$
9) $24^{\frac{1}{4}}a^3b^4$
10) $2xy^{\frac{8}{5}}$
11) 2
12) $y\cdot\sqrt[3]{4a^2y}$
13) $\sqrt[5]{rt^2v^3}$
14) $\sqrt[3]{x}$
15) $x^2\cdot\sqrt[5]{y^2a^2}$
16) x^{11}
17) $125x$
18) $8y^6$
19) $a^{-2}b^8c^{-5}$ or $\frac{b^8}{a^2c^5}$
20) 1
21) 18.53 cm^2
22) 254 km
23) 2.98 x 10^{-15} m