Tutorial 01: Algebra

Evaluate each of the following.

a) $125^{1/3}$ b) $243^{1/5}$ c) $256^{1/4}$

d) $512^{1/9}$ e) $343^{1/3}$ f) $512^{1/3}$

Evaluate each of the following.

a) $512^{-7/9}$ b) $243^{-6/5}$ c) $256^{-3/4}$

d) $125^{-4/3}$ e) $343^{-2/3}$ f) $512^{-2/3}$

Evaluate each of the following.

a) $\left(\frac{4}{9}\right)^{2}$ b) $\left(\frac{5}{7}\right)^{3}$ c) $\left(\frac{2}{3}\right)^{6}$

d) $\left(\frac{8}{5}\right)^{3}$ e) $\left(\frac{5}{9}\right)^{3}$ f) $\left(\frac{4}{3}\right)^{4}$

Evaluate each of the following.

a) $\left(\frac{4}{9}\right)^{-2}$ b) $\left(\frac{5}{7}\right)^{-3}$ c) $\left(\frac{2}{3}\right)^{-6}$

d) $\left(\frac{8}{5}\right)^{-3}$ e) $\left(\frac{5}{9}\right)^{-3}$ f) $\left(\frac{4}{3}\right)^{-4}$

Evaluate each of the following.

a) $\left(\frac{32}{243}\right)^{6/5}$ b) $\left(\frac{16}{81}\right)^{3/4}$ c) $\left(\frac{625}{256}\right)^{-1/4}$

d) $\left(\frac{216}{343}\right)^{1/3}$ e) $\left(\frac{125}{512}\right)^{-2/3}$ f) $\left(\frac{125}{729}\right)^{2/3}$

Each of the following expressions can be written as a^n for some value of n. In each case determine the value of n.

a) $a \times a \times a \times a$ b) $\frac{1}{a \times a \times a}$ c) 1

d) $\sqrt[3]{a^5}$ e) $a^3 \times a^5$ f) $\frac{a^6}{a^2}$

g) $(a^4)^2$ h) $\frac{a^2 \times a^5}{(a^3)^3}$ i) $\sqrt{a} \times \frac{1}{a^{-2}}$

j) $a^{1/2} \times a^2$ k) $\frac{1}{a^{-3}} \times \frac{1}{a^{-2}}$ l) $\frac{1}{(a^{-2})^3}$

Simplify each of the following expressions giving your answer in the form Cx^n, where C and n are numbers.

a) $3x^2 \times 2x^4$ b) $5x \times 4x^5$ c) $(2x^3)^4$

d) $\frac{8x^6}{2x^3}$ e) $\frac{3}{x^2} \times 4x^5$ f) $12x^8 \times \frac{1}{3x^2}$

g) $(5x^3)^{-1}$ h) $(9x^4)^{1/2}$ i) $2x^6 \times \frac{1}{4x^{-2}}$

j) $2x^4 \times \frac{1}{x^5}$ k) $(2x)^4 \times \frac{1}{x^5}$ l) $6x^3 \times \frac{1}{(2x)^{-1}}$

Simplify each expression:

i. $\frac{3^8}{3^6}$

ii. $\frac{3^6}{3^8}$

iii. $\frac{d^{14}}{d^{17}}$

iv. $\frac{n^{-1}}{n^{-4}}$

v. $\frac{5a^{-7}}{10a^{-9}}$

vi. $\frac{3^2m^5t^6}{3^5m^7t^{-5}}$

Q. Find the area of a square whose side is $5x^3$

i. Write an expression for the perimeter of the above square

ii. Find the volume of a cube whose side is $2x^2$

Q. Simplify the following. Express each expression in positive exponents.

i. $(n^5)^2(4mn^{-2})$

ii. $(x^{-2})^2(3xy^5)^4$

iii. $(3c^5)^4(c^2)^3$

iv. $(n^3)^6$

v. $(b^{-7})^3$

vi. $(3a)^4$

vii. $(9x^5)^2(x^2)^5$

viii. $(b^2)^{\square} = b^8$

ix. $\left(m^{\square}\right)^3 = m^{-12}$

x. $(m^2n^3)^{\square} = \frac{1}{m^6n^9}$

Solve each equation. Use the fact that if a^x=a^y then $x = y$.

i. $5^x = 25^x$

ii. $3^x = 27^4$

iii. $2^x = \frac{1}{32}$

Evaluate each expression for s=4 and t=8.

A. $s^4 + t^2 + s \div 2$

B. $(st)^2$

C. $3st^2 \div s \times t + 6$

D. $(t - s)^5$

E. $(2s)^2t$

F. $\frac{(3s)^3t+t}{s}$