NAME: SOLUTIONS

QUIZ 2

Applied Mathematics for Electronics Engineering (201-943-DW)
Dawson College, Sept. 9th 2011
Instructor: E. Richer

Question 1. *(1 mark each)*
Evaluate the following.

(a) $16^{-\frac{3}{2}} = \left(16^{\frac{1}{2}}\right)^{-3} = \left(\sqrt{16}\right)^{-3} = \frac{1}{4^3} = \boxed{\frac{1}{64}}$

(b) $-16^{-\frac{3}{2}} = -\frac{1}{16^{3/2}} = \boxed{-\frac{1}{64}}$

(c) $-16^{\frac{3}{2}} = -16^{3/2} = -\left(\left(16\right)^{\frac{1}{2}}\right)^3 = -(4)^3 = \boxed{-64}$

(d) $16^{\frac{3}{2}} = \boxed{64}$

Question 2. *(1 mark each)*
Evaluate the following.

(a) $64^{\frac{2}{3}} = \left(64^{\frac{1}{3}}\right)^2 = \left(\sqrt[3]{64}\right)^2 = 4^2 = \boxed{16}$

(b) $(-64)^{\frac{2}{3}} = \left(\left(-64\right)^{\frac{1}{3}}\right)^2 = \left(\sqrt[3]{-64}\right)^2 = (-4)^2 = \boxed{16}$

(c) $-64^{-\frac{2}{3}} = -\frac{1}{64^{2/3}} = -\frac{1}{\left(\sqrt[3]{64}\right)^2} = -\frac{1}{4^2} = \boxed{-\frac{1}{16}}$

(d) $(-64)^{-\frac{2}{3}} = \frac{1}{(-64)^{2/3}} = \frac{1}{\left(\sqrt[3]{-64}\right)^2} = \frac{1}{(-4)^2} = \boxed{\frac{1}{16}}$

Question 3. *(2 marks each)*
Simplify the given expressions. Express results with positive exponents only.

(a) $\frac{(3\sqrt{t})^{-1}}{3t^{-\frac{1}{2}}} = \frac{t^{1/2}}{3(3\sqrt{t})} = \frac{t^{1/2}}{9t^{1/2}} = \boxed{\frac{1}{9}}$

(b) $\left(\frac{1}{x^{-\frac{1}{3}}}\right)^{-1} = \frac{1^{-1}}{x^{1/3}} = \boxed{\frac{1}{x^{1/3}}}$

(c) $3a^{-\frac{2}{3}}(-3a)^{\frac{5}{9}} = \frac{3(-3a)^{5/9}}{a^{2/3}} = \frac{3(-3)^{5/9}a^{5/9}}{a^{6/9}} = \frac{(-1)^{5/9}3\cdot 3^{5/9}}{a^{1/9}}$

$= \boxed{-\frac{3^{14/9}}{a^{1/9}}}$

(d) $\frac{(-5b)^{-2}}{5^{-3}b^2} = \frac{5^3}{(-5b)^2b^2} = \frac{5^3}{(-5)^2b^2b^2} = \boxed{\frac{5}{b^4}}$

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Question 1. *(1 mark each)*
Evaluate the following.

(a) $25^{\frac{3}{2}} = (25^{1/2})^3 = 5^3 = \boxed{125}$

(b) $-25^{\frac{3}{2}} = \boxed{-125}$

(c) $-25^{-\frac{3}{2}} = -\frac{1}{25^{3/2}} = \boxed{-\frac{1}{125}}$

(d) $25^{-\frac{3}{2}} = \frac{1}{25^{3/2}} = \boxed{\frac{1}{125}}$

Question 2. *(1 mark each)*
Evaluate the following.

(a) $(-27)^{\frac{2}{3}} = \left((-27)^{1/3}\right)^2 = \left(\sqrt[3]{-27}\right)^2 = (-3)^2 = \boxed{9}$

(b) $27^{\frac{2}{3}} = (27^{1/3})^2 = 3^2 = \boxed{9}$

(c) $-27^{-\frac{2}{3}} = -\frac{1}{27^{2/3}} = \boxed{-\frac{1}{9}}$

(d) $(-27)^{-\frac{2}{3}} = \frac{1}{(-27)^{2/3}} = \boxed{\frac{1}{9}}$

Question 3. *(2 marks each)*
Simplify the given expressions. Express results with positive exponents only.

(a) $\frac{(3\sqrt{t})^{-1}}{3t^{-\frac{1}{2}}}$

(b) $(\frac{1}{x^{-\frac{1}{3}}})^{-1}$

See version (1)

(c) $3a^{-\frac{2}{3}}(-3a)^{\frac{5}{9}}$

(d) $\frac{(-5b)^{-2}}{5^{-3}b^2}$