

# MATH 190 QUIZ 1 SOLUTIONS

September 4, 2014

1. Let  $x, y$  be a nonzero real numbers, and  $a, b, c$  be constants. Complete the following rules.

(a)  $x^0 = \underline{1}$                       (b)  $x^{-a} = \underline{\frac{1}{x^a}}$                       (c)  $x^a \cdot x^b = \underline{x^{a+b}}$

(d)  $\frac{x^a}{x^b} = \underline{x^{a-b}}$                       (e)  $\sqrt[b]{x^a} = \underline{x^{\frac{a}{b}}}$                       (f)  $(x^a)^b = \underline{x^{ab}}$

(g)  $\left(\frac{x^a}{y^b}\right)^c = \underline{\frac{x^{ac}}{y^{bc}}}$                       (h)  $(x^a \cdot y^b)^c = \underline{x^{ac} \cdot y^{bc}}$                       (i)  $\left(\frac{x}{y}\right)^{-a} = \underline{\left(\frac{y}{x}\right)^a = \frac{y^a}{x^a}}$

(j)  $x^{-\frac{b}{a}} = \underline{\frac{1}{\sqrt[a]{x^b}}}$  (rewrite WITHOUT using a negative or fractional power)

2. Simplify the following expressions. Write all answers with positive exponents only.

(a)  $\sqrt[4]{a^{16}b^8c^{-12}} = \underline{\frac{a^4b^2}{c^3}}$                       (b)  $\left(\frac{4x^2}{2y^{-3}}\right)^3 = \underline{8x^6y^9}$                       (c)  $\frac{(m^6)^{-2}(m^3)^4}{(m^{-3})^5} = \underline{m^{15}}$

(d)  $\left(\frac{a^5b^7c^8}{a^{-3}b^{-4}c^{-3}}\right)^{-3} = \underline{\frac{1}{a^{24}b^{33}c^{33}}}$                       (e)  $\left(\frac{x^{-3a+2}}{x^{-5a-4}}\right)^3 = \underline{x^{6a+18}}$  (a is positive)

(f)  $3ab^5 \frac{(4a^{-2}bc^4)^3}{(a^5b^{-2}c^{-7})^{-2}} = \underline{\frac{192a^5b^4}{c^2}}$                       (g)  $\left(\frac{64x^4y^5}{32xy^{-2}}\right)^5 = \underline{32x^{15}y^{35}}$

(h)  $-(16x^2y^{-2})^0 = \underline{-1}$                       (i)  $(r^3)^4(r^{-2}s^2)^3(s^3)^4 = \underline{r^6s^{18}}$

(j)  $\left(\frac{x^3y^2}{3x^7y^5}\right)^2 \left(\frac{2x^5y^{-3}}{5x^{-2}y^4}\right)^{-2} = \underline{\frac{25y^8}{36x^{22}}}$

**Bonus Question:** Expand and simplify:  $(x+2)^2(x+3) = \underline{x^3 + 7x^2 + 16x + 12}$