UNIT 4 MCR 3UI Exam Review

**Be able to graph $y = 2^x$, $y = 3^x$, $y = \left(\frac{1}{2}\right)^x$, $y = \left(\frac{1}{3}\right)^x$ with transformations.

1. Simplify. Leave only positive exponents.

a) $\dfrac{a^{-3}b^2}{a^{-2}b^{-5}}$ $\longrightarrow = \dfrac{a^2b^2b^5}{a^3}$

$= a^{-3-(-2)}b^{2-(-5)}$

$= \dfrac{b^7}{a}$

$= a^{-1}b^7$

$= \dfrac{b^7}{a}$

b) $\sqrt{\sqrt{16x^{12}}}$

$= \sqrt{\sqrt{16}}\left(\left(x^{12}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}}$

$= \sqrt{4}\ x^{\frac{12}{4}}$

$= 2x^3$

$\left(\left(16x^{12}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}}$

$= \left((16)^{\frac{1}{2}}\right)^{\frac{1}{2}}\left(\left(x^{12}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}}$

$= 16^{\frac{1}{4}}\ x^{\frac{12}{4}}$

$= \sqrt[4]{16}\ x^3$

$= 2x^3$

c) $(32x^{10}y^{15})^{1/5}$

$= (32)^{\frac{1}{5}}(x^{10})^{\frac{1}{5}}(y^{15})^{\frac{1}{5}}$

$= \sqrt[5]{32}\ x^2y^3$

$= 2x^2y^3$

$\frac{10}{1}\left(\frac{1}{5}\right)$

$\cancel{\frac{10}{50}}$

2. Write $\sqrt[5]{x^3}$ in exponential form.

$(x^3)^{1/5}$

$= x^{3/5}$

3. Write in radical form, then evaluate – no decimals!!

flip the base

a) $121^{-5/2}$ ← square root

$$\begin{array}{r} 121 \\ \times 11 \\ \hline 1331 \\ \times 11 \\ 14641 \\ 161051 \end{array}$$

$= \frac{1}{(\sqrt{121})^5}$

$= \frac{1}{11^5}$

$= \frac{1}{161051}$

b) $\left(\frac{625}{16}\right)^{-3/4}$

$= \frac{(\sqrt[4]{16})^3}{(\sqrt[4]{625})^3}$

$= \frac{2^3}{5^3}$

$= \frac{8}{125}$

4. Solve. (Only trial and error are required.)

$$2^{x+3} = 16^{2x-1}$$

$$2^{x+3} = (2^4)^{2x-1}$$

$$2^{x+3} = 2^{8x-4}$$

$$x + 3 = 8x - 4$$

$$-7x = -7$$

$$x = 1$$