20S Pre-Calculus Rational Exponents

Part A: Change to rational exponents and simplify

1. $\sqrt[5]{32x^{10}y^2}$

$2x^{2}y^{2/5}$

2. $\sqrt[3]{27x^8y^{18}}$

$3x^{8/3}y^{6}$

3. $\sqrt[4]{625x^2}$

$5x^{1/2}$

4. $\sqrt[6]{64x^{18}y^{20}}$

$2x^{3}y^{10/3}$

5. $\sqrt[4]{81x^4y^5z}$

$3xy^{5/4}z^{1/4}$

6. $\sqrt[5]{x^{35}y^{15}z^2}$

$7x^{7}y^{3}z^{2/5}$

Part B: Simplify each of the following

1. $\sqrt[5]{32x^{10}y^2} \cdot \sqrt[7]{128x^2y^6}$

$2x^{2}y^{2/5} \cdot 2x^{2/7}y^{6/7}$

$4x^{16/7}y^{48/35}$

2. $\sqrt{36x^{10}y^2} \cdot \sqrt[5]{32x^4y^4}$

$6x^{5}y \cdot 2x^{4/5}y^{4/5}$

$12x^{29/5}y^{9/5}$

3. $\sqrt[2]{64x^{10}y^2} \cdot \sqrt[3]{128x^2y^6}$

$8x^{5}y \cdot 5x^{2/3}y^{2}$

$40x^{17/3}y^{3}$

4. $\sqrt[4]{16x^{10}y^2} \cdot \sqrt[4]{81x^3y^5}$

$2x^{5/2}y^{1/2} \cdot 3x^{3/4}y^{5/4}$

$6x^{7/4}y^{3/4}$

5. $\sqrt[3]{-27x^{12}y^7} \cdot \sqrt[8]{256x^6y^6}$

$-3x^{4}y^{7/3} \cdot 2x^{3/4}y^{3/4}$

$-6x^{19/4}y^{37/12}$

6. $\sqrt[3]{125x^{14}y^9} \cdot \sqrt[5]{243x^{35}y^6}$

$5x^{14/3}y^{3} \cdot 3x^{7}y^{6/5}$

$15x^{35/3}y^{21/5}$

Part C: Simplify as a single rational exponent

1. $\sqrt[5]{\sqrt{3}}$

$\left(3^{1/2}\right)^{1/5} = 3^{1/10}$

2. $\sqrt[3]{27 \bullet \sqrt{3}}$

$\sqrt[3]{3^3 \cdot \sqrt{3}}$

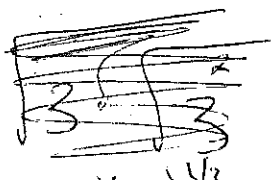
$3 \cdot \left(3^{1/2}\right)^{1/3}$

$3 \cdot 3^{1/6} = 3^{7/6}$

3. $\sqrt[5]{\sqrt[4]{\sqrt{27}}}$

$\left(\left(27^{1/2}\right)^{1/4}\right)^{1/5} = 27^{1/40}$

4. $\sqrt[3]{\sqrt[5]{\sqrt{3 \bullet \sqrt{9}}}}$



$\left(\left(\left(3^{1/2}\right)^{1/5}\right)^{1/3}\right) \cdot \left(\left(\left(3^{1}\right)^{1/2}\right)^{1/5}\right)^{1/3}$

$3^{\frac{1}{30}} \cdot 3^{\frac{31}{30}} = 3^{\frac{32}{30}}$ $\left(\frac{16}{15}\right)$ $\left(\frac{1}{15}\right)$