

Simplify the following. Remember that negative exponents are not allowed in the final answer.

1. $(2x)^3(3x)(4x)^2$

2. $(2y^3)^3(3y^2)^{-2}$

3. $\left(\frac{z^2}{t^3}\right)^4 \left(\frac{z^3}{t}\right)^5$

4. $\left(\frac{5u^2v}{2uv^2}\right)^2 \left(\frac{-3uv}{2u^2v}\right)^{-3}$

5. $\frac{3^{-r}}{3^{-s-r}}$ (assume r and s are positive)

Evaluate the radicals and rationalize where needed

6. $\sqrt[3]{-27x^3y^7}$

7. $\sqrt[5]{\frac{x^3}{y^2}}$

8. $(x^2y^4)^{\frac{1}{2}}$

9. $\sqrt{16y^8z^{-2}}$

10. $\sqrt[5]{\frac{4x^6y}{9x^3}}$

Multiply the factors.

11. $2x(3x + 1)(5x - 2)$

12. $(2d - 5v)^2$

Factor the following completely

13. $81x^2 + 36x + 4$

14. $x^6 - 64$

15. $x^2 - yz + xz - xy$

Perform the indicated operation & reduce

16. $\frac{x^2-x-2}{x^2+2x+1}$

17. $\frac{1}{x+4} - \frac{3}{x^2+8x+16}$

18. $\frac{t^2-t-6}{t^2-6t+9} \cdot \frac{t^2+4t-5}{t^2-25}$

19. $\frac{\frac{u^3+v^3}{u^2-v^2}}{\frac{u^2-uv+v^2}{u+v}}$

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