

Simplify each expression below using exponent rules. Your final answer should not include any negative exponents. You MUST show work in order to receive credit.

|                          |                                    |                                 |
|--------------------------|------------------------------------|---------------------------------|
| 1. $x^5 \cdot x^2$       | 2. $y^3 \cdot y \cdot y^4$         | 3. $b^4 \cdot b^{-4}$           |
| 4. $7x^3y^2 \cdot 5xy^9$ | 5. $a^{10} \cdot a^2 \cdot a^{-6}$ | 6. $(z^5)^5$                    |
| 7. $(b^7)^2$             | 8. $(m^{-8})^{-3}$                 | 9. $(x^2y^4m^3)^8$              |
| 10. $(3x^2)^4$           | 11. $(2ab)^5$                      | 12. $(2x^3y)^6$                 |
| 13. $(m^7)^4 \cdot m^3$  | 14. $p^2 \cdot (p^5)^2$            | 15. $\frac{x^5}{x^2}$           |
| 16. $\frac{c^4}{c^8}$    | 17. $\frac{5x^{-4}}{x^{-9}}$       | 18. $\frac{x^3 \cdot x^4}{x^2}$ |

Simplify:

a)  $\frac{p+4}{p^2+6p+8}$

b)  $\frac{p^2-3p-10}{p^2+p-2}$

|                                       |                                           |                                       |
|---------------------------------------|-------------------------------------------|---------------------------------------|
| 19. $\left(\frac{6}{z^4}\right)^3$    | 20. $\left(\frac{a^3}{b^5}\right)^4$      | 21. $\left(\frac{3x^4}{y^6}\right)^5$ |
| 22. $\left(\frac{m^4}{5n^9}\right)^3$ | 23. $\left(\frac{3x^7}{2y^{12}}\right)^4$ | 24. $(8m)^0$                          |
| 25. $5x^0y^5$                         | 26. $2x^{-2}$                             | 27. $5m^{-3}n^4$                      |
| 28. $3x^{-2}y^{-5}$                   | 29. $(x^{-2}y^2)^{-3}$                    | 30. $(4x^4y^{-3})^{-2}$               |
| 31. $(f^{-3}g^5h^8)^{-3}$             | 32. $(x^2)^4 \cdot 3x^5$                  | 33. $(3x^3)^2 \cdot (2x)^3$           |

Find the sum or difference

a)  $\frac{3}{b-8} + \frac{7}{b+3}$

b)  $\frac{4}{x+1} - \frac{2}{x+2}$