

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. $x^5 \cdot x^2$ x^7	2. $y^3 \cdot y \cdot y^4$ y^8	3. $b^4 \cdot b^{-4}$ $b^0 = 1$
4. $7x^3y^2 \cdot 5xy^9$ $35x^4y^{11}$	5. $a^{10} \cdot a^2 \cdot a^{-6}$ a^6	6. $(z^5)^5$ z^{25}
7. $(b^7)^2$ b^{14}	8. $(m^{-8})^{-3}$ m^{24}	9. $(x^2y^4m^3)^8$ $x^{16}y^{32}m^{24}$
10. $(3x^2)^4$ 3^4x^8 $= 81x^8$	11. $(2ab)^5$ $2^5a^5b^5$ $= 32a^5b^5$	12. $(2x^3y)^6$ $2^6x^{18}y^6$ $= 64x^{18}y^6$
13. $(m^7)^4 \cdot m^3$ $m^{28} \cdot m^3$ $= m^{31}$	14. $p^2 \cdot (p^5)^2$ $p^2 \cdot p^{10}$ $= p^{12}$	15. $\frac{x^5}{x^2} = x^3$
16. $\frac{c^4}{c^8} = c^{-4}$ $= \frac{1}{c^4}$	17. $\frac{5x^{-4}}{x^{-9}}$ $= 5x^5$	18. $\frac{x^3 \cdot x^4}{x^2}$ $= \frac{x^7}{x^2} = x^5$

Simplify:

$$a) \frac{p+4}{p^2+6p+8} = \frac{1}{p+2}$$

$$b) \frac{p^2-3p-10}{p^2+p-2} = \frac{p-5}{p-1}$$

19. $\left(\frac{6}{z^4}\right)^3$ $= \frac{6^3}{z^{12}} = \frac{216}{z^{12}}$	20. $\left(\frac{a^3}{b^5}\right)^4 = \frac{a^{12}}{b^{20}}$	21. $\left(\frac{3x^4}{y^6}\right)^5$ $= \frac{3^5 x^{20}}{y^{30}} = \frac{243x^{20}}{y^{30}}$
22. $\left(\frac{m^4}{5n^9}\right)^3 = \frac{m^{12}}{5^3 n^{27}}$ $= \frac{m^{12}}{125n^{27}}$	23. $\left(\frac{3x^7}{2y^{12}}\right)^4 = \frac{3^4 x^{28}}{2^4 y^{48}}$ $= \frac{81x^{28}}{16y^{48}}$	24. $(8m)^0$ 1
25. $5x^0y^5$ $5y^5$	26. $2x^{-2}$ $\frac{2}{x^2}$	27. $5m^{-3}n^4$ $\frac{5n^4}{m^3}$
28. $3x^{-2}y^{-5}$ $\frac{3}{x^2y^5}$	29. $(x^{-2}y^2)^{-3}$ x^6y^{-6} $= \frac{x^6}{y^6}$	30. $(4x^4y^{-3})^{-2}$ $4^{-2}x^{-8}y^6$ $= \frac{y^6}{16x^4}$
31. $(f^{-3}g^5h^8)^{-3}$ $f^9g^{-15}h^{-24}$ $= \frac{f^9}{g^{15}h^{24}}$	32. $(x^2)^4 \cdot 3x^5$ $x^8 \cdot 3x^5$ $3x^{13}$	33. $(3x^3)^2 \cdot (2x)^3$ $3^2x^6 \cdot 2^3x^3$ $9x^6 \cdot 8x^3$ $72x^9$

Find the Sum or difference

$$a) \frac{3}{b-8} + \frac{7}{b+3} = \frac{10b-45}{(b-8)(b+3)}$$

$$b) \frac{4}{x+1} - \frac{2}{x+2} = \frac{2x+6}{(x+1)(x+2)}$$