Simplify the following expressions, and then evaluate where possible:

1. $(x^7)(x^3)(x^6)$

2. $5^9 \div 5^6$

3. $(x^3)^5$

4. $(y^3)^2 (y^5)$

5. $[(-1)^3]^3$

6. $4^6 \div 4^9$

7. $2n^4 \cdot 5n^4$

8. $\dfrac{x^4 x^7}{x^{11}}$

9. $9xy^2 \cdot 3x^5y^2$

10. $(2b^2)^4$

11. $\dfrac{-3r^3}{3r}$

12. $7v^3 \cdot 10u^3v^5 \cdot 2uv^3$

13. $\dfrac{10p^4}{6p^2}$

14. $\dfrac{4y^4}{14yx^8}$

15. $\dfrac{16yx^4}{6x^8y^2}$

16. $\dfrac{(8x^3)(4xy^3)}{2x^4 \cdot 14y^3}$

17.   Consider the expression $\dfrac{(-3m^2n)(4m^3n^2)}{(2m^4n^2)(3mn)}$

a) Substitute m = 4 and n = -3 into the expression and evaluate it:

b) Simplify the original expression using the exponent laws:

c) What are the advantages and disadvantages of the two methods?

18. Your job: Invent an expression containing exponents that, when simplified, is equal to:

$$2p^2q$$

- Show all the steps required to prove that your expression simplifies correctly.
- The simplification should include all three exponent laws if possible. (product, quotient and power of a power).
- You are free to introduce any variables or operations you wish, as long as your original expression simplifies to the above expression

Answers:

1) x^{16} 2) 125 3) x^{15} 4) y^{11} 5) -1 6) $\frac{1}{64}$ 7) $10n^8$ 8) 1

9) $27x^6y^4$ 10) $16b^8$ 11) $-r^2$ 12) $140u^4v^{11}$ 13) $\frac{5p^2}{3}$ 14) $\frac{2y^3}{7x^8}$

15) $\frac{8}{3x^4y}$ 16) $\frac{8}{7}$ 17) a) -2 b) -2 c) answers may vary   18) answers vary