

Answers

Build-up Exercise 1A (page 1.11)

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|--------------------------------|-----------------------------|
| 1. (a) a^7 | (b) $-8a^2b^4$ |
| (c) $\frac{b^3}{3}$ | |
| 2. (a) $27x^3$ | (b) $-32x^{15}y^{10}$ |
| (c) $-3x^{15}y^6$ | |
| 3. (a) $\frac{9}{4h^2}$ | (b) $\frac{4h^6}{k^4}$ |
| (c) $\frac{8k^6}{125h^3}$ | |
| 4. (a) $-\frac{1}{p^2}$ | (b) $-\frac{8p^4}{q^3}$ |
| (c) $10p^4q^2$ | |
| 5. (a) $-a^7b^5$ | (b) $432a^{10}b^{15}$ |
| 6. (a) $\frac{x^2y^4}{9}$ | (b) $\frac{9y^2}{2}$ |
| 7. (a) $\frac{1}{y^6}$ | (b) $\frac{y^5}{8x^3}$ |
| 8. (a) $\frac{u}{16v}$ | (b) $-2uv^2$ |
| 9. (a) $\frac{p^5}{q}$ | (b) $-\frac{4p^7}{q}$ |
| 10. (a) $-\frac{m^7}{n^9}$ | (b) $\frac{12n^2}{m^4}$ |
| 11. (a) $\frac{1}{p^2q^6}$ | (b) $\frac{2}{27p^7q^{19}}$ |
| 12. (a) $-\frac{p^9}{5q^{11}}$ | (b) $\frac{2}{p^{16}q^4}$ |
| 13. (a) $\frac{4x^2}{y^8}$ | (b) $\frac{5p^8q^3}{16}$ |
| 14. (a) 128 | (b) 45 |
| 15. (a) $\frac{3}{17}$ | (b) $-3a^4$ |

$$16. 25^{56} > 5^{100} > 625^{20} > 125^{25}$$

Build-up Exercise 1B (page 1.13)

- | | |
|--------------------------------|----------------------------|
| 17. (a) 1 | (b) 1 |
| (c) $\frac{2}{9}$ | |
| 18. (a) $3a^3$ | (b) $\frac{2}{3a^2}$ |
| (c) $\frac{a^2}{9b^2}$ | |
| 19. (a) $\frac{2b^4}{a^4}$ | (b) $\frac{a^2}{b^{11}}$ |
| (c) $\frac{1}{a^6b^2}$ | |
| 20. (a) 36 | (b) $\frac{729}{2}$ |
| (c) $\frac{9}{64}$ | |
| 21. (a) $\frac{a^2}{9b^3}$ | (b) $\frac{16a^4}{b^7}$ |
| (c) $16a^2b^8$ | |
| 22. (a) $\frac{27y^4}{2x^3}$ | (b) $\frac{x^9}{27y^{12}}$ |
| (c) $\frac{1}{y^3}$ | |
| 23. (a) $\frac{m^4}{n^6}$ | (b) $\frac{n^{14}}{4m^2}$ |
| (c) $\frac{32}{m^8}$ | |
| 24. (a) $\frac{q^6}{16p^8}$ | (b) $\frac{p^{12}}{16q^4}$ |
| (c) $\frac{27q^{21}}{8p^{33}}$ | |
| 25. (a) $\frac{1}{abc^4}$ | (b) $\frac{9b^3}{a^4c^2}$ |
| (c) $\frac{b^5}{9ac^3}$ | |

26. (a) $\frac{v^{13}}{3}$ (b) $\frac{u^5}{2}$
 (c) $\frac{u^4 v^{12}}{2}$

27. (a) 5^{-n+8} (b) 2^{n+7}
 (c) 3^{n+6}

28. $x = -3, y = 1$

29. $27^{-27} < 81^{-20} < 3^{-79} < 9^{-39}$

30. (a) -1 (b) 3
 (c) -3

Build-up Exercise 1C (page 1.15)

31. (a) 5.89×10^5 (b) -2.368×10^{-3}
 (c) 8.450×10^{-2} (d) 3.03×10^5

32. (a) 7.525×10^{12} (b) -9.695×10^{33}
 (c) 2.62×10^{-11} (d) 3×10^3

33. (a) 24 200 000 (b) 0.000 011 22
 (c) $-4\,550\,000\,000$ (d) $-0.000\,890\,9$

34. (a) 1.062×10^{12} (b) $1.048\,95 \times 10^{-35}$
 (c) 3×10^{-12} (d) 2.6×10^5

35. (a) 0.000 027 (b) 0.000 072 6
 (c) 6 000 000 (d) 0.000 035

36. $3^{-10} = 1.69 \times 10^{-5}$
 $4^{-9} = 3.81 \times 10^{-6}$
 $6^{-7} = 3.57 \times 10^{-6}$
 $7^{-6} = 8.50 \times 10^{-6}$
 $6^{-7} < 4^{-9} < 7^{-6} < 3^{-10}$

37. $21^{22} = 1.23 \times 10^{29}$
 $22^{21} = 1.55 \times 10^{28}$
 $20^{23} = 8.39 \times 10^{29}$
 $23^{20} = 1.72 \times 10^{27}$
 $20^{23} > 21^{22} > 22^{21} > 23^{20}$

38. 1.645×10^9 cm

39. 1.25×10^{13} m³

40. (a) 2.809×10^{-9} (b) 2.048×10^7
 (c) 6×10^5

41. (a) 2.2×10^8 (b) 2.42×10^{-2} mg

42. (a) 1.25×10^8 mL
 (b) Yes