

**ST(P) MATHEMATICS 3A
NOTES AND ANSWERS****CHAPTER 1 Making Sure of Arithmetic**

This chapter is mainly revision, but the last section is new work. It can be worked through as consolidation of earlier work or parts of it can be used as and when necessary to act as reminders.

EXERCISE 1a (p. 2)

This exercise, together with Exercises 1b, and 1c, can be used for discussion and provides a useful reminder of basic operations with fractions, before algebraic fractions—Chapter 23.

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| 1. 21 | 14. $\frac{9}{10}$ | 27. $\frac{7}{30}$ |
| 2. 18 | 15. $1\frac{29}{40}$ | 28. $\frac{1}{20}$ |
| 3. 40 | 16. 1 | 29. $\frac{1}{40}$ |
| 4. 12 | 17. $1\frac{17}{48}$ | 30. $\frac{5}{18}$ |
| 5. 6 | 18. $\frac{11}{12}$ | 31. $3\frac{29}{40}$ |
| 6. 20 | 19. $\frac{8}{9}$ | 32. $\frac{7}{18}$ |
| 7. 12 | 20. $1\frac{3}{4}$ | 33. $-\frac{9}{40}$ |
| 8. 60 | 21. $2\frac{1}{5}$ | 34. $3\frac{11}{12}$ |
| 9. 42 | 22. $\frac{71}{126}$ | 35. $4\frac{7}{8}$ |
| 10. 18 | 23. $1\frac{13}{24}$ | 36. $\frac{17}{20}$ |
| 11. 24 | 24. $1\frac{23}{42}$ | 37. $4\frac{2}{15}$ |
| 12. 72 | 25. $\frac{13}{36}$ | 38. $\frac{1}{8}$ |
| 13. $1\frac{13}{24}$ | 26. $\frac{1}{36}$ | 39. $1\frac{1}{12}$ |

EXERCISE 1b (p. 4)

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|--------------------|-------------------|-------------------|
| 1. $\frac{5}{9}$ | 6. $\frac{3}{10}$ | 11. 3 |
| 2. $1\frac{1}{3}$ | 7. $\frac{4}{7}$ | 12. 3 |
| 3. $1\frac{1}{2}$ | 8. 6 | 13. $\frac{3}{2}$ |
| 4. $\frac{1}{10}$ | 9. $\frac{7}{22}$ | 14. $\frac{4}{3}$ |
| 5. $\frac{10}{21}$ | 10. 2 | 15. $\frac{8}{7}$ |

EXERCISE 1c (p. 5)

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|------------------|-------------------|--------------------|
| 1. $\frac{1}{4}$ | 4. $\frac{1}{10}$ | 7. $\frac{1}{100}$ |
| 2. 2 | 5. 8 | 8. $\frac{9}{2}$ |
| 3. $\frac{5}{2}$ | 6. $\frac{11}{3}$ | 9. $\frac{4}{15}$ |

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| 10. $1\frac{1}{3}$ | 20. $\frac{69}{112}$ | 30. $\frac{2}{5}$ |
| 11. 2 | 21. $\frac{8}{25}$ | 31. $\frac{22}{63}$ |
| 12. $\frac{5}{8}$ | 22. $2\frac{1}{18}$ | 32. 14 |
| 13. $6\frac{1}{4}$ | 23. $5\frac{3}{10}$ | 33. 7 |
| 14. $\frac{14}{81}$ | 24. $\frac{57}{110}$ | 34. $\frac{9}{50}$ |
| 15. $\frac{2}{3}$ | 25. $4\frac{23}{42}$ | 35. $1\frac{2}{25}$ |
| 16. $\frac{12}{49}$ | 26. $\frac{7}{20}$ | 36. $\frac{1}{14}$ |
| 17. $\frac{1}{18}$ | 27. $-\frac{1}{2}$ | 37. $\frac{21}{68}$ |
| 18. $4\frac{1}{2}$ | 28. $3\frac{7}{12}$ | 38. $1\frac{1}{4}$ |
| 19. $\frac{13}{30}$ | 29. $3\frac{3}{140}$ | 39. 2 |

EXERCISE 1d (p. 7)

This exercise, together with Exercises 1e, 1f and 1g, revises basic operations with decimals. If recurring decimals were not covered in Book 1A, they can be discussed now.

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|---------------------|-----------------------|-------------|
| 1. $\frac{7}{20}$ | 9. $\frac{11}{100}$ | 17. 0.0625 |
| 2. $\frac{27}{125}$ | 10. $2\frac{1}{20}$ | 18. 0.54 |
| 3. $\frac{51}{250}$ | 11. $1\frac{13}{125}$ | 19. 1.75 |
| 4. $1\frac{9}{25}$ | 12. $\frac{1}{10000}$ | 20. 0.15625 |
| 5. $\frac{3}{100}$ | 13. 0.15 | 21. 0.16 |
| 6. $\frac{3}{250}$ | 14. 0.125 | 22. 0.3125 |
| 7. $\frac{1}{200}$ | 15. 0.6 | 23. 2.375 |
| 8. $1\frac{1}{100}$ | 16. 0.24 | 24. 0.002 |

EXERCISE 1e (p. 9)

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| 1. $0.\dot{3}$ | 5. $0.14285\dot{7}$ | 9. $0.41\dot{6}$ |
| 2. $0.\dot{2}$ | 6. $0.08\dot{3}$ | 10. $0.0\dot{7}1428\dot{5}$ |
| 3. $0.8\dot{3}$ | 7. $0.0\dot{9}$ | 11. $0.2\dot{3}$ |
| 4. $0.0\dot{6}$ | 8. $0.0\dot{5}$ | 12. $0.07692\dot{3}$ |

EXERCISE 1f (p. 10)

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|---------|------------|-----------|
| 1. 5.01 | 6. 26.36 | 11. 3.3 |
| 2. 19.1 | 7. 4.832 | 12. 0.08 |
| 3. 6.17 | 8. 1.106 | 13. 1.21 |
| 4. 8.8 | 9. 0.00202 | 14. 0.49 |
| 5. 1.82 | 10. 3.2 | 15. 23.02 |

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| 16. 0.361 | 27. 0.000384 | 38. 7.8 |
| 17. 1.83 | 28. 7 | 39. 0.5 |
| 18. 0.0068 | 29. 0.3 | 40. 129 |
| 19. 0.96 | 30. 2.7 | 41. 11.882 |
| 20. 0.042 | 31. 0.008 | 42. 3.094 |
| 21. 0.008 | 32. 0.015 | 43. 1 |
| 22. 0.01 | 33. 5.9 | 44. 2 |
| 23. 0.25 | 34. 1 | 45. 1.69 |
| 24. 0.36072 | 35. 0.02 | 46. 0.2 |
| 25. 3.36 | 36. 0.001 | 47. 0.4 |
| 26. 3.35511 | 37. 0.6 | 48. 8.95 |

EXERCISE 1g (p. 11)

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| 1. < | 6. > | 11. $0.79, \frac{4}{5}, 0.85$ |
| 2. > | 7. > | 12. $\frac{1}{5}, \frac{2}{7}, 0.3$ |
| 3. < | 8. > | 13. $\frac{5}{7}, 0.75, \frac{7}{9}, 0.875$ |
| 4. < | 9. > | 14. $\frac{3}{20}, 0.16, 0.2, \frac{6}{25}$ |
| 5. > | 10. $0.6, \frac{2}{3}, \frac{4}{5}$ | 15. $1\frac{1}{8}, 1\frac{1}{5}, 1.24, 1.3$ |

EXERCISE 1h (p. 12)

This exercise, together with Exercises 1i and 1j, revises the work on positive and negative indices from Book 2A but with harder examples. Fractional indices are covered in Book 4A.

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| 1. 25 | 10. 27 783 | 19. 5^4 | 28. 4^3 |
| 2. 81 | 11. 325 | 20. 2^5 | 29. Not possible |
| 3. 32 | 12. 8010 | 21. 7^7 | 30. 3^4 |
| 4. 125 | 13. 720 | 22. 4^9 | 31. 3^3 |
| 5. 64 | 14. 1102 | 23. a^5 | 32. a^4 |
| 6. 144 | 15. 1 100 000 | 24. Not possible | 33. Not possible |
| 7. 1600 | 16. 2^7 | 25. 2^2 | 34. 64 |
| 8. 864 | 17. 3^7 | 26. 7 | 35. 81 |
| 9. 2048 | 18. Not possible | 27. Not possible | 36. 15 625 |

EXERCISE 1i (p. 14)

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|-------------------|--------------------|--------------------|----------------------|
| 1. $\frac{1}{2}$ | 6. $\frac{1}{4}$ | 11. 4 | 16. $\frac{y}{x}$ |
| 2. $\frac{1}{10}$ | 7. $\frac{1}{a}$ | 12. $1\frac{1}{3}$ | 17. $\frac{1}{8}$ |
| 3. $\frac{1}{5}$ | 8. $\frac{1}{x}$ | 13. 5 | 18. $\frac{1}{25}$ |
| 4. $\frac{1}{7}$ | 9. 3 | 14. $1\frac{1}{4}$ | 19. $\frac{1}{1000}$ |
| 5. $\frac{1}{8}$ | 10. $1\frac{1}{2}$ | 15. a | 20. $\frac{1}{36}$ |

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|-----------------------|------------|---------------------|------------------------|
| 21. $\frac{1}{32}$ | 26. 16 | 31. 8 | 36. $12\frac{1}{4}$ |
| 22. $\frac{1}{10000}$ | 27. 32 | 32. 36 | 37. $5\frac{1}{16}$ |
| 23. $\frac{1}{100}$ | 28. 81 | 33. $1\frac{7}{9}$ | 38. $2\frac{7}{9}$ |
| 24. $\frac{1}{64}$ | 29. 512 | 34. $3\frac{3}{8}$ | 39. $123\frac{37}{81}$ |
| 25. 125 | 30. 10 000 | 35. $5\frac{1}{16}$ | 40. $2\frac{14}{25}$ |

EXERCISE 1j (p. 16)

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|-------------------|------------------|----------------------|------------------------|--------------------|
| 1. 8 | 5. 1 | 9. 16 | 13. 1 | 17. $\frac{1}{12}$ |
| 2. $6\frac{1}{4}$ | 6. 1 | 10. 1 | 14. $2\frac{314}{343}$ | 18. 729 |
| 3. $\frac{1}{16}$ | 7. 125 | 11. $2\frac{10}{27}$ | 15. $\frac{1}{4}$ | 19. 64 |
| 4. 64 | 8. $\frac{1}{9}$ | 12. $3\frac{1}{2}$ | 16. $\frac{64}{125}$ | 20. 1 |

EXERCISE 1k (p. 16)

This revises standard form. For those with scientific calculators, Number 28 explains the notation used, but there is some variety in the display of scientific notation on different calculators.

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| 1. 345 | 10. 2.65×10^2 | 19. 5.87×10^4 |
| 2. 1200 | 11. 1.8×10^{-1} | 20. 2.6×10^3 |
| 3. 0.0501 | 12. 3.02×10^3 | 21. 4.5×10^5 |
| 4. 0.0047 | 13. 1.9×10^{-2} | 22. 7×10^{-6} |
| 5. 280 | 14. 7.67×10^4 | 23. 8×10^{-1} |
| 6. 0.73 | 15. 3.9×10^5 | 24. 5.6×10^{-4} |
| 7. 902 000 | 16. 8.5×10^{-4} | 25. 2.4×10^4 |
| 8. 0.000637 | 17. 7×10^3 | 26. 3.9×10^7 |
| 9. 8 720 000 | 18. 4×10^{-3} | 27. 8×10^1 |
28. a) 6.25×10^{10} b) 6.6049×10^{12} c) 6.4×10^{-9} d) 4.9×10^{-11}

EXERCISE 1l (p. 18)

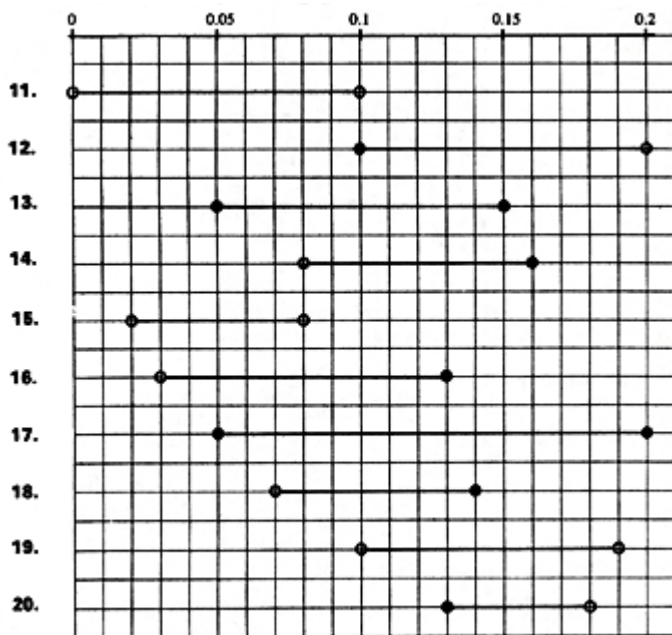
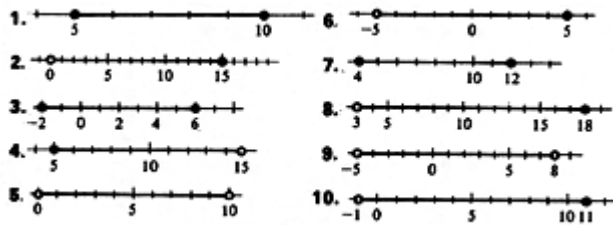
Deals with decimal places and significant figures and should be revised before later work involving use of calculators, in Chapters 18, 19 and 20.

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|-------------|-----------|--------------------|-------------|
| 1. a) 2.785 | b) 2.78 | 9. a) 254.163 | b) 254 |
| 2. a) 0.157 | b) 0.157 | 10. a) 0.001 | b) 0.000926 |
| 3. a) 3.209 | b) 3.21 | 11. a) 7.820 | b) 7.82 |
| 4. a) 0.073 | b) 0.0733 | 12. a) 0.010 | b) 0.00964 |
| 5. a) 0.151 | b) 0.151 | 13. 0.04; 0.0384 | |
| 6. a) 0.020 | b) 0.0204 | 14. 60 000; 47 500 | |
| 7. a) 0.780 | b) 0.780 | 15. 0.05; 0.0447 | |
| 8. a) 3.299 | b) 3.30 | 16. 80; 69.8 | |

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| 17. 0.2; 0.216 | 25. 60; 56.0 |
| 18. 500 000; 665 000 | 26. 0.04; 0.0390 |
| 19. 2; 2.17 | 27. 80; 69.3 |
| 20. 0.2; 0.217 | 28. 0.03; 0.0328 |
| 21. 9; 8.89 | 29. 2; 1.74 |
| 22. 0.0; 0.0688 | 30. 0.06; 0.0403 |
| 23. 5; 4.58 | 31. 0.1; 0.105 |
| 24. 6; 5.38 | |

EXERCISE 1m (p. 20)

This section introduces the number line and the open and closed circle notation. For Numbers 1–20 we suggest that the number line is drawn once and the ranges placed below the line. In Numbers 21–40 the pupils are asked to draw a number line for each question — this takes a considerable time if they are drawn accurately and scaled. It is sensible to encourage rough sketches here.



7. a) 5.7×10^5 b) 5.7×10^{-2}
8. $445 \leq \text{number of tacks} \leq 454$ (whole numbers)
9. $0.745\text{m} \leq \text{diameter} < 0.755\text{m}$
10. $495\text{g} \leq \text{weight} < 505\text{g}$