CHAPTER 1 BASIC ARITHMETIC

EXERCISE 1 Page 5

1. Evaluate 67 kg – 82 kg + 34 kg without using a calculator.

$$\begin{array}{r} 67 \\ +\ 34 \\ \hline 101 \end{array} \qquad \begin{array}{r} 101 \\ -\ 82 \\ \hline 19 \end{array}$$

Hence, 67 kg – 82 kg + 34 kg = 19 kg

2. Evaluate 73 m – 57 m without using a calculator.

$$\begin{array}{r} 73 \\ 57 \\ \hline 16 \end{array}$$

Hence, 73 m – 57 m = 16 m

3. Evaluate 851 mm – 372 mm without using a calculator.

$$\begin{array}{r} 851 \\ 372 \\ \hline 479 \end{array}$$

Hence, 851 mm – 372 mm = 479 mm

4. Evaluate 124 – 273 + 481 – 398 without using a calculator.

$$\begin{array}{r} 124 \\ +\ 481 \\ \hline 605 \end{array} \qquad \begin{array}{r} 273 \\ +\ 398 \\ \hline 671 \end{array} \qquad \begin{array}{r} 671 \\ -\ 605 \\ \hline 66 \end{array}$$

Hence, 124 – 273 + 481 – 398 = 605 – 671 = – 66

5. Evaluate £927 – £114 + £182 – £183 – £247 without using a calculator.

$$\begin{array}{r} 927 \\ +\ 182 \\ \hline 1109 \end{array} \qquad \begin{array}{r} 114 \\ +\ 183 \\ 247 \\ \hline 544 \end{array} \qquad \begin{array}{r} 1109 \\ -\ 544 \\ \hline 565 \end{array}$$

Hence, £927 – £114 + £182 – £183 – £247 = £1109 – £544 = £565

6. Evaluate 647 – 872 without using a calculator.

872
647
225

Hence, 872 – 627 = 225 and 627 – 872 = – 225

7. Evaluate 2417 – 487 + 2424 – 1778 – 4712 without using a calculator.

2417 + 2424 = 4841

487 + 1778 = 4712

4712 + 6977

6977 – 4841 = 2136

Hence, 2417 – 487 + 2424 – 1778 – 4712 = 4841 – 6977 = – (6977 – 4841) = – 2136

8. Evaluate – 38 419 – 2177 + 2440 – 799 + 2834 without using a calculator.

2440 + 2834 = 5274

38419 + 2177 = 41395

41395 – 5274 = 36121

Hence, – 38 419 – 2177 + 2440 – 799 + 2834 = 5274 – 41 395 = – (41 395 – 5274) = – 36 121

9. Evaluate £2715 – £18 250 + £11 471 – £1509 + £113 274 without using a calculator.

2715 + 11471 = 113274

18250 + 1509 = 19759

113274 + 19759

127460 – 19759 = 107701

Hence, £2715 – £18 250 + £11 471 – £1509 + £113 274 = £127 460 – £19 759 = £107 701

10. Evaluate 47 + (–74) – (–23) without using a calculator.

47 + (–74) – (–23) = 47 – 74 + 23 = 70 – 74 = –4

11. Evaluate $813 - (-674)$ without using a calculator.

$813 - (-674) = 813 + 674$

$$\begin{array}{r} 813 \\ 674 \\ \hline 1487 \end{array}$$

Hence, $813 - (-674) = 1487$

12. Evaluate $3151 - (-2763)$ without using a calculator.

$3151 - (-2763) = 3151 + 2763$

$$\begin{array}{r} 3151 \\ 2763 \\ \hline 5914 \end{array}$$

Hence, $3151 - (-2763) = 5914$

13. Evaluate $4872\text{ g} - 4683\text{ g}$ without using a calculator.

$$\begin{array}{rr} & 4872 \\ - & 4683 \\ \hline & 189 \end{array}$$

Hence, $4872\text{ g} - 4683\text{ g} = 189\text{ g}$

14. Evaluate $-23148 - 47724$ without using a calculator.

$$\begin{array}{rr} & 23148 \\ + & 47724 \\ \hline & 70872 \end{array}$$

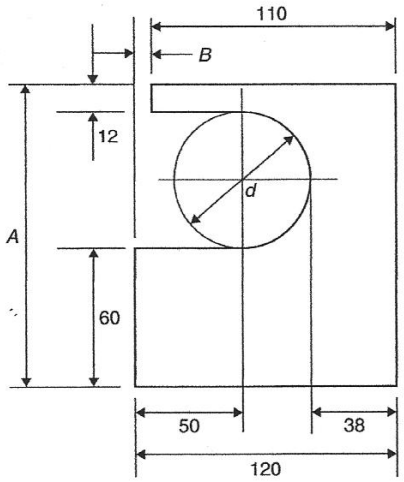
Hence, $-23148 - 47724 = -70872$

15. Evaluate $\$53774 - \$38441$ without using a calculator.

$$\begin{array}{rr} & 53774 \\ - & 38441 \\ \hline & 15333 \end{array}$$

Hence, \$53 774 – \$38 441 = \$15 333

16. Calculate the diameter *d* and dimensions *A* and *B* for the template shown. All dimensions are in millimetres.



Radius of circle = 120 – 50 – 38 = 32 mm

Hence, diameter, $d = 2 \times 32 = 64$ mm

Dimension $A = 60 + 64 = 12 = 136$ mm

Dimension $B = 120 - 110 = 10$ mm

EXERCISE 2 Page 7

1. Evaluate (a) 78×6 (b) 124×7 without using a calculator.

(a)
$$\begin{array}{r} 78 \\ \times\ 6 \\ \hline 468 \\ {\scriptstyle 4} \end{array}$$

Hence, $78 \times 6 = 468$

(b)
$$\begin{array}{r} 124 \\ \times\ 7 \\ \hline 868 \\ {\scriptstyle 1\ 2} \end{array}$$

Hence, $124 \times 7 = 868$

2. Evaluate (a) £261×7 (b) £462×9 without using a calculator.

(a)
$$\begin{array}{r} 261 \\ \times\ 7 \\ \hline 1827 \\ {\scriptstyle 4} \end{array}$$

Hence, £261×7 = £1827

(b)
$$\begin{array}{r} 462 \\ \times\ 9 \\ \hline 4158 \\ {\scriptstyle 5\ 1} \end{array}$$

Hence, £462×9 = £4158

3. Evaluate (a) 783 kg $\times$ 11 (b) 73 kg $\times$ 8 without using a calculator.

(a)
$$\begin{array}{r} 783 \\ \times\ 11 \\ \hline 783 \\ 7830 \\ \hline 8613 \\ {\scriptstyle 1\ 1} \end{array}$$

Hence, 783 kg $\times$ 11 = 8613 kg

(b)
$$\begin{array}{r} 73 \\ \times\ 8 \\ \hline 584 \\ {\scriptstyle 2} \end{array}$$

Hence, 73 kg × 8 = 584 kg

4. Evaluate (a) 27 mm × 13 (b) 77 mm × 12 without using a calculator.

(a)
$$\begin{array}{r} 27 \\ \times\ 13 \\ \hline 81 \\ 270 \\ \hline 351 \\ {\scriptstyle 1} \end{array}$$

Hence, 27 mm × 13 = 351 mm

(b)
$$\begin{array}{r} 77 \\ \times\ 12 \\ \hline 154 \\ 770 \\ \hline 924 \\ {\scriptstyle 1} \end{array}$$

Hence, 77 mm × 12 = 924 mm

5. Evaluate (a) 448 × 23 (b) 143 × (–31) without using a calculator.

(a)
$$\begin{array}{r} 448 \\ \times\ 23 \\ \hline 1344 \\ 8960 \\ \hline 10304 \\ {\scriptstyle 1\ 1} \end{array}$$

Hence, 448 × 23 = 10 304

(b)
$$\begin{array}{r} 143 \\ \times\ 31 \\ \hline 143 \\ 4290 \\ \hline 4433 \\ {\scriptstyle 1} \end{array}$$

Hence, 143 × 31 = 4433 and 143 × (–31) = – 4433

6. Evaluate (a) 288 m ÷ 6 (b) 979 m ÷ 11 without using a calculator.

(a)
$$6\overline{)288}\quad 48$$

Hence, $288 \text{ m} \div 6 = 48 \text{ m}$

(b)
$$11\overline{)979}\quad 89$$

Hence, $979 \text{ m} \div 11 = 89 \text{ m}$

7. Evaluate (a) $\frac{1813}{7}$ (b) $\frac{896}{16}$ without using a calculator.

(a)
$$7\overline{)1813}\quad 259$$

Hence, $1813 \div 7 = 259$

(b)
$$16\overline{)896}\quad 56$$

Hence, $896 \div 16 = 56$

8. Evaluate (a) $\frac{21\,424}{13}$ (b) $15\,900 \div 15$ without using a calculator.

(a)
$$13\overline{)21424}\quad 1648$$

Hence, $21\,424 \div 13 = 1648$

(b)
$$15\overline{)15900}\quad 1060$$

Hence, $15\,900 \div 15 = 1060$

9. Evaluate (a) $\frac{88\,737}{11}$ (b) $46\,858 \div 14$ without using a calculator.

(a)
$$11\overline{)88737}\quad 8067$$

Hence, $88737 \div 11 = 8067$

(b)
$$14\overline{)46858}\quad 3347$$

Hence, $46858 \div 14 = 3347$

10. A screw has a mass of 15 grams. Calculate, in kilograms, the mass of 1200 such screws (1 kg = 1000 g).

Mass of 1200 screws = $15 \times 1200 = 18\,000$ g

$$\begin{array}{r} 1200 \\ \times \quad 15 \\ \hline 6000 \\ 12000 \\ \hline 18000 \end{array}$$

Mass of 1200 screws, in kilograms = $\dfrac{18\,000}{1000} = 18$ kg

11. Holes are drilled 35.7 mm apart in a metal plate. If a row of 26 holes is drilled, determine the distance, in centimetres, between the centres of the first and last holes.

If there are 26 holes drilled, then there are 25 spaces between the first and last hole drilled.

Hence, distance between centres of the first and last hole = 25×35.7 mm = 892.5 mm

= 89.25 cm

$$\begin{array}{r} 357 \\ \times \quad 25 \\ \hline 1785 \\ 7140 \\ \hline 8925 \end{array}$$

Hence, $35.7 \times 25 = 892.5$

12. A builder needs to clear a site of bricks and top soil. The total weight to be removed is 696 tonnes. Trucks can carry a maximum load of 24 tonnes. Determine the number of truck loads needed to clear the site.

Number of truck loads = $696 \div 24$

$$24\overline{)696}\quad 29$$

Hence, number of truck loads needed = 29

EXERCISE 3 Page 8

1. Find (a) the HCF and (b) the LCM of: 8, 12

$8 = 2 \times 2 \times 2$

$12 = 2 \times 2 \times 3$

(a) HCF = $2 \times 2 = 4$, which is the largest number that will divide into both 8 and 12

(b) LCM = $2 \times 2 \times 2 \times 3 = 24$, and is the smallest number into which 8 and 12 will both divide exactly.

2. Find (a) the HCF and (b) the LCM of: 60, 72

$60 = 2 \times 2 \times 3 \times 5$

$72 = 2 \times 2 \times 2 \times 3 \times 3$

(a) HCF = $2 \times 2 \times 3 = 12$, which is the largest number that will divide into both 60 and 72

(b) LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$, and is the smallest number into which 60 and 72 will both divide exactly.

3. Find (a) the HCF and (b) the LCM of: 50, 70

$50 = 2 \times 5 \times 5$

$70 = 2 \times 5 \times 7$

(a) HCF = $2 \times 5 = 10$, which is the largest number that will divide into both 50 and 70

(b) LCM = $2 \times 5 \times 5 \times 7 = 350$, and is the smallest number into which 50 and 70 will both divide exactly.

4. Find (a) the HCF and (b) the LCM of: 270, 900

$270 = 2 \times 3 \times 3 \times 3 \times 5$

$900 = 2 \times 2 \times 3 \times 3 \times 5 \times 5$

(a) HCF = $2 \times 3 \times 3 \times 5 = 90$, which is the largest number that will divide into both 270 and 900

(b) LCM = $2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 = 2700$, and is the smallest number into which 270 and 900 will both divide exactly.

5. Find (a) the HCF and (b) the LCM of: 6, 10, 14

$6 = 2 \times 3$

$10 = 2 \times 5$

$14 = 2 \times 7$

(a) HCF = 2, which is the largest number that will divide into 6, 10 and 14

(b) LCM = $2 \times 3 \times 5 \times 7 = 210$, and is the smallest number into which 6, 10 and 14 will divide exactly.

6. Find (a) the HCF and (b) the LCM of: 12, 30, 45

$12 = 2 \times 2 \times 3$

$30 = 2 \times 3 \times 5$

$45 = 3 \times 3 \times 5$

(a) HCF = 3, which is the largest number that will divide into 12, 30 and 45

(b) LCM = $2 \times 2 \times 3 \times 3 \times 5 = 180$, and is the smallest number into which 12, 30 and 45 will divide exactly.

7. Find (a) the HCF and (b) the LCM of: 10, 15, 70, 105

$10 = 2 \times 5$

$15 = 3 \times 5$

$70 = 2 \times 5 \times 7$

$105 = 3 \times 5 \times 7$

(a) HCF = 5, which is the largest number that will divide into 10, 15, 70 and 105

(b) LCM = $2 \times 3 \times 5 \times 7 = 210$, and is the smallest number into which 10, 15, 70 and 105 will divide exactly.

8. Find (a) the HCF and (b) the LCM of: 90, 105, 300

$90 = 2 \times 3 \times 3 \times 5$

$105 = 3 \times 5 \times 7$

$300 = 2 \times 2 \times 3 \times 5 \times 5$

(a) HCF = $3 \times 5 = 15$, which is the largest number that will divide into 90, 105 and 300

(b) LCM = $2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7 = 6300$, and is the smallest number into which 90, 105 and 300 will divide exactly.

9. Find (a) the HCF and (b) the LCM of: 196, 210, 462, 910

$196 = 2 \times 2 \times 7 \times 7$

$210 = 2 \times 3 \times 5 \times 7$

$462 = 2 \times 3 \times 7 \times 11$

$910 = 2 \times 5 \times 7 \times 13$

(a) HCF = $2 \times 7 = 14$, which is the largest number that will divide into 196, 210, 462 and 910

(b) LCM = $2 \times 2 \times 3 \times 5 \times 7 \times 7 \times 11 \times 13 = 420\,420$, and is the smallest number into which 196, 210, 462 and 910 will divide exactly.

10. Find (a) the HCF and (b) the LCM of: 196, 350, 770

$196 = 2 \times 2 \times 7 \times 7$

$350 = 2 \times 5 \times 5 \times 7$

$770 = 2 \times 5 \times 7 \times 11$

(a) HCF = $2 \times 7 = 14$, which is the largest number that will divide into 196, 350 and 770

(b) LCM = $2 \times 2 \times 5 \times 5 \times 7 \times 7 \times 11 = 53\,900$, and is the smallest number into which 196, 350 and 770 will divide exactly.

EXERCISE 4 Page 10

1. Evaluate: $14 + 3 \times 15$

$14 + 3 \times 15 = 14 + 45 = 59$

2. Evaluate: $17 - 12 \div 4$

$17 - 12 \div 4 = 17 - 3 = 14$

3. Evaluate: $86 + 24 \div (14 - 2)$

$86 + 24 \div (14 - 2) = 86 + 24 \div 12 = 86 + 2 = 88$

4. Evaluate: $7(23 - 18) \div (12 - 5)$

$7(23 - 18) \div (12 - 5) = 7 \times 5 \div 7 = 35 \div 7 = 5$

5. Evaluate: $63 - 8(14 \div 2) + 26$

$63 - 8(14 \div 2) + 26 = 63 - 8 \times 7 + 26 = 63 - 56 + 26 = 33$

6. Evaluate: $\frac{40}{5} - 42 \div 6 + (3 \times 7)$

$\frac{40}{5} - 42 \div 6 + (3 \times 7) = 8 - 7 + 21 = 29 - 7 = 22$

7. Evaluate: $\frac{(50-14)}{3} + 7(16 - 7) - 7$

$\frac{(50-14)}{3} + 7(16 - 7) - 7 = \frac{36}{3} + 7 \times 9 - 7 = 12 + 63 - 7 = 75 - 7 = 68$

8. Evaluate: $\dfrac{(7-3)(1-6)}{4(11-6)\div(3-8)}$

$$\frac{(7-3)(1-6)}{4(11-6)\div(3-8)}=\frac{4\times-5}{4\times5\div-5}=\frac{-20}{4\times-1}=\frac{-20}{-4}=5$$

9. Evaluate: $\dfrac{(3+9\times6)\div3-2\div2}{3\times6+(4-9)-3^2+5}$

$$\frac{(3+9\times6)\div3-2\div2}{3\times6+(4-9)-3^2+5}=\frac{(3+54)\div3-1}{18-5-9+5}=\frac{19-1}{9}=\frac{18}{9}=2$$

10. Evaluate: $\dfrac{(4\times3^2+24)\div5+9\times3}{2\times3^2-15\div3}+\dfrac{2+27\div3+12\div2-3^2}{5+(13-2\times5)-4}$

$$\frac{(4\times3^2+24)\div5+9\times3}{2\times3^2-15\div3}+\frac{2+27\div3+12\div2-3^2}{5+(13-2\times5)-4}=\frac{(36+24)\div5+27}{18-5}+\frac{2+9+6-9}{5+3-4}$$

$$=\frac{60\div5+27}{13}+\frac{8}{4}=\frac{39}{13}+\frac{8}{4}$$

$$=3+2=5$$

11. Evaluate: $\dfrac{1+\sqrt{25}+3\times2-8\div2}{3\times4-\sqrt{(3^2+4^2)}+1}-\dfrac{(4\times2+7\times2)\div11}{\sqrt{9}+12\div2-2^3}$

$$\frac{1+\sqrt{25}+3\times2-8\div2}{3\times4-\sqrt{(3^2+4^2)}+1}-\frac{(4\times2+7\times2)\div11}{\sqrt{9}+12\div2-2^3}=\frac{1+5+6-4}{12-5+1}-\frac{(8+14)\div11}{3+6-8}$$

$$=\frac{8}{8}-\frac{2}{1}$$

$$=1-2=-1$$