Four Operations Revision Worksheet - Worked Solutions

Whole Numbers, Decimals, and Negative Numbers

Section 1: Addition and Subtraction

1. $45 + 376 =$

   Solution:

   $$\begin{aligned} 45 + 376 &= 45 + 300 + 76 \\ &= 345 + 76 \\ &= 345 + 50 + 26 \\ &= 395 + 26 \\ &= 421 \end{aligned}$$

   Alternatively: Line up vertically:

   $$\begin{array}{r} 45 \\ +\ 376 \\ \hline 421 \end{array}$$

2. $328.5 + 19.47 =$

   Solution: Line up decimal points:

   $$\begin{array}{rl} & 328.50 \quad \text{(add trailing zero for clarity)} \\ + & 19.47 \\ \hline & 347.97 \end{array}$$

   $$328.5 + 19.47 = 347.97$$

3. $7.63 + (-2.8) =$

   Solution: Adding a negative is the same as subtraction:

   $$\begin{aligned} 7.63 + (-2.8) &= 7.63 - 2.8 \\ &= 7.63 - 2.80 \quad \text{(line up decimals)} \\ &= 4.83 \end{aligned}$$

4. $-12 + 7 =$

   Solution: Think of a number line: start at -12, move 7 to the right:

   $$-12 + 7 = -5$$

   Alternatively: $12 - 7 = 5$, but since -12 has larger magnitude, answer is negative: -5.

5. $56.3 - 18.72 =$

   Solution: Line up decimals, borrow as needed:

   $$\begin{array}{rl} & 56.30 \quad \text{(add trailing zero)} \\ - & 18.72 \\ \hline & 37.58 \end{array}$$

   $$56.3 - 18.72 = 37.58$$

6. $-4 - (-9) =$

   Solution: Subtracting a negative is the same as adding:

   $$\begin{aligned} -4 - (-9) &= -4 + 9 \\ &= 5 \end{aligned}$$

Section 2: Multiplication

1. $24 \times 6 =$
2. $-2 \times -3 \times -2 =$
3. $0.25 \times 0.4 =$
4. $1.2 \times 0.06 =$
5. $3.4 \times 1.2 =$
6. $5.6 \times (-0.3) =$
7. $12.5 \times 0.08 =$
8. $0.09 \times 0.7 =$
9. $-3 \times 4 =$
10. $0.0034 \times 68.7 =$
11. $-4.2 \times 0.5 \times -0.5 =$
12. $-0.6 \times -0.3 \times -2 =$

Solutions:

1. $24 \times 6 = 144$

   Working: $20 \times 6 = 120$, $4 \times 6 = 24$, total $120 + 24 = 144$.

2. $-2 \times -3 \times -2 = -12$

   Working: Count negatives: three negatives (odd number) gives negative answer.

   $$(-2 \times -3) \times -2 = (6) \times -2 = -12$$

3. $0.25 \times 0.4 = 0.1$

   Working: Method 1 - Counting decimal places:

   $$25 \times 4 = 100$$

   2 decimal places in 0.25 + 1 decimal place in 0.4 = 3 decimal places total. So answer is $0.100 = 0.1$.

4. $1.2 \times 0.06 = 0.072$

   Working: $12 \times 6 = 72$, 1 decimal place + 2 decimal places = 3 decimal places: 0.072.

5. $3.4 \times 1.2 = 4.08$ (as shown in example)

6. $5.6 \times (-0.3) = -1.68$

   Working: $56 \times 3 = 168$, 1 decimal place + 1 decimal place = 2 decimal places: 1.68. One negative: answer is negative: -1.68.

7. $12.5 \times 0.08 = 1.0$

   Working: $125 \times 8 = 1000$, 1 decimal place + 2 decimal places = 3 decimal places: $1.000 = 1.0$.

8. $0.09 \times 0.7 = 0.063$

   Working: $9 \times 7 = 63$, 2 decimal places + 1 decimal place = 3 decimal places: 0.063.

9. $-3 \times 4 = -12$

   Working: One negative: answer negative. $3 \times 4 = 12$, so -12.

10. $0.0034 \times 68.7 = 0.23358$

    Working: $34 \times 687 = 23358$ (calculate: $34 \times 600 = 20400$, $34 \times 87 = 2958$, total 23358). 4 decimal places + 1 decimal place = 5 decimal places: 0.23358.

11. $-4.2 \times 0.5 \times -0.5 = 1.05$

    Working: Two negatives: answer positive. First: $4.2 \times 0.5 = 2.1$ ($42 \times 5 = 210$, 1+1=2 decimal places: 2.10). Then: $2.1 \times 0.5 = 1.05$ ($21 \times 5 = 105$, 1+1=2 decimal places: 1.05).

12. $-0.6 \times -0.3 \times -2 = -0.36$

    Working: Three negatives: answer negative. First: $0.6 \times 0.3 = 0.18$ ($6 \times 3 = 18$, 1+1=2 decimal places). Then: $0.18 \times 2 = 0.36$. With negative sign: -0.36.

Section 3: Division

1. $84 \div 7 = 12$

   Working: $7 \times 12 = 84$, or bus stop:

   $$\begin{array}{ll} 7\overline{)84} & 7 \text{ into } 8 = 1 \text{ remainder } 1 \\ & \text{Bring down } 4, 7 \text{ into } 14 = 2 \\ & \text{Answer: } 12 \end{array}$$

2. $156 \div 12 = 13$

   Working: Chunking: $156 \div 4 = 39$, then $39 \div 3 = 13$. Or: $12 \times 13 = 156$.

3. $48 \div (-6) = -8$

   Working: One negative: answer negative. $48 \div 6 = 8$, so -8.

4. $4.8 \div 0.4 = 12$

   Working: Multiply both by 10: $48 \div 4 = 12$.

5. $-9 \div -3 = 3$

   Working: Two negatives: answer positive. $9 \div 3 = 3$.

6. $8280 \div 24 = 345$

   Working: Bus stop method:

   $$\begin{array}{ll} 24\overline{)8280} & 24 \text{ into } 82 = 3 \ (24 \times 3 = 72) \\ & 82 - 72 = 10, \text{ bring down } 8 = 108 \\ & 24 \text{ into } 108 = 4 \ (24 \times 4 = 96) \\ & 108 - 96 = 12, \text{ bring down } 0 = 120 \\ & 24 \text{ into } 120 = 5 \ (24 \times 5 = 120) \\ & \text{Answer: } 345 \end{array}$$

7. $3.6 \div 0.6 = 6$

   Working: Multiply both by 10: $36 \div 6 = 6$.

8. $0.84 \div 0.07 = 12$

   Working: Multiply both by 100: $84 \div 7 = 12$.

9. $7.2 \div 0.6 = 12$

   Working: Multiply both by 10: $72 \div 6 = 12$.

10. $-12.6 \div 0.3 = -42$

    Working: One negative: answer negative. Multiply both by 10: $126 \div 3 = 42$, so -42.

11. $0.56 \div 0.08 = 7$

    Working: Multiply both by 100: $56 \div 8 = 7$.

12. $6.4 \div (-0.2) = -32$

    Working: One negative: answer negative. Multiply both by 10: $64 \div 2 = 32$, so -32.

13. $-1.8 \div 0.3 = -6$

    Working: One negative: answer negative. Multiply both by 10: $18 \div 3 = 6$, so -6.

14. $-0.45 \div 0.05 = -9$

    Working: One negative: answer negative. Multiply both by 100: $45 \div 5 = 9$, so -9.

Section 4: Mixed Practice

1. $12.5 + (-3.4) = 9.1$

   Working: $12.5 - 3.4 = 9.1$.

2. $-3 \times 4 \times -2 = 24$

   Working: Two negatives: answer positive. $3 \times 4 = 12$, $12 \times 2 = 24$.

3. $24 \div (-6) + 5 \times 2 = 6$

   Working: BODMAS: division and multiplication first. $24 \div (-6) = -4$, $5 \times 2 = 10$. Then: $-4 + 10 = 6$.

4. $6.3 \div 0.3 = 21$

   Working: Multiply both by 10: $63 \div 3 = 21$.

5. $(-2.4 \times 3.5) \div -0.7 = 12$

   Working: First: $-2.4 \times 3.5 = -8.4$ (one negative). Then: $-8.4 \div -0.7 = 12$ (two negatives: positive). Check: $8.4 \div 0.7 = 84 \div 7 = 12$.

6. $-15 + 28.4 \div 4 = -8.9$

   Working: Division first: $28.4 \div 4 = 7.1$. Then: $-15 + 7.1 = -7.9$.

7. $7.25 - 3.68 = 3.57$

   Working: Line up decimals:

$$\begin{array}{r} 7.25 \\ -\ 3.68 \\ \hline 3.57 \end{array}$$

8. $-8 \times (5 - 7) = 16$

   Working: Brackets first: $5 - 7 = -2$. Then: $-8 \times -2 = 16$ (two negatives: positive).

9. $9.6 \div 1.2 + (-3) \times 2 = 2$

   Working: Division and multiplication first: $9.6 \div 1.2 = 8$ (multiply both by 10: $96 \div 12 = 8$). $(-3) \times 2 = -6$. Then: $8 + (-6) = 8 - 6 = 2$.

10. $-36 \div (-9) = 4$

    Working: Two negatives: positive. $36 \div 9 = 4$.

Extension Word Problems

1. The temperature was $-3°$C and dropped by $5°$C overnight. What is the new temperature?

   Solution: Dropping means subtracting:

$$-3 - 5 = -8$$

   New temperature: $-8°$C.

2. A scuba diver descends 2.5 m per minute for 4 minutes, then ascends 3 m. What is the diver's final depth?

   Solution: Descend: $2.5 \times 4 = 10$ m down (negative if surface is 0). Ascend: 3 m up (positive). Starting at surface (0 m):

$$0 - 10 + 3 = -7$$

   Final depth: 7 m below surface.

3. A submarine starts at sea level and travels vertically -4.2 km, then another -3.8 km. How far is it from the surface now? What is the submarine's altitude?

Solution: Both movements are downward (negative):

$$0 + (-4.2) + (-3.8) = -8.0$$

Distance from surface: 8.0 km (absolute value). Altitude: -8.0 km (8 km below sea level).

4. Some numbers produce recurring decimals when used as divisors. Find the decimal result of 1 divided by each of the first 7 prime numbers. Some results terminate while others recur. Can you explain why?

   Solution: First 7 primes: 2, 3, 5, 7, 11, 13, 17.

$$\begin{aligned}
1 \div 2 &= 0.5 \quad \text{(terminates)} \\
1 \div 3 &= 0.\overline{3} \quad \text{(repeats)} \\
1 \div 5 &= 0.2 \quad \text{(terminates)} \\
1 \div 7 &= 0.\overline{142857} \quad \text{(repeats)} \\
1 \div 11 &= 0.\overline{09} \quad \text{(repeats)} \\
1 \div 13 &= 0.\overline{076923} \quad \text{(repeats)} \\
1 \div 17 &= 0.\overline{0588235294117647} \quad \text{(repeats)}
\end{aligned}$$