Chapter 3

Comparing ordering and the number line

Learn the ideas below, follow each worked example, then attempt the practice before checking the answers.

3.1 Comparison symbols

Use = for equal to, < for less than and > for greater than. The open side of an inequality faces the larger value. Compare whole numbers by the number of digits first, then compare from the left. Leading zeros do not make a number larger.

Worked example 9,087 > 9,078 because the thousands and hundreds agree, but 8 tens is greater than 7 tens. Also, 0064 = 64.

3.2 Ordering decimals

Align decimal points and compare corresponding places. You may add zeros at the right of a decimal without changing its value. Compare the whole parts first, then tenths, hundredths and further places until a difference appears.

Worked example Compare 4.7 and 4.68 by writing 4.70 and 4.68. Seven tenths exceeds six tenths, so 4.7 > 4.68. Ascending order is 4.608, 4.68, 4.7.

3.3 The number line

A number line has equally spaced marks for equal changes in value. Numbers increase to the right and decrease to the left. Choose a useful scale and label zero when it lies in the displayed interval. Fractions and decimals can be placed between integers.

Worked example If the distance from 0 to 1 is divided into four equal intervals, the marks are 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1. Each interval represents 0.25.

3.4 Comparing negative numbers

A number farther right on the number line is greater. Among negative numbers, the one closer to zero is greater. Think about temperature or debt to understand the order. Absolute size and numerical order answer different questions.

Worked example $-2 > -7$ because -2 is farther right. However, $|-7| > |-2|$ because the distance 7 is larger than the distance 2. Ascending order of -1, -6, 3 and 0 is -6, -1, 0, 3.

3.5 Comparing fractions and finding midpoints

Compare positive fractions using a common denominator, equivalent decimals or cross products when denominators are positive. For a midpoint, add the two values and divide by 2. A midpoint is equally far from both endpoints.

Worked example $\frac{3}{5} = \frac{24}{40}$ and $\frac{5}{8} = \frac{25}{40}$, so $\frac{3}{5} < \frac{5}{8}$. An integer denominator method gives $3 \times 8 = 24 < 25 = 5 \times 5$. The midpoint of -4 and 6 is $(-4 + 6) \div 2 = 1$.

Chapter 3 practice

Work in your notebook. Show your method and include units where needed.

1. Put 0.72, 0.7 and 0.702 in ascending order.
2. Insert < or > between −9 and −4.
3. Which is larger, $\frac{7}{12}$ or $\frac{3}{5}$?
4. Find the midpoint of 2.4 and 5.8.
5. A line runs from 0 to 2 in eight equal intervals. What is each interval?

Answers with methods

1. 0.700 < 0.702 < 0.720, so the order is 0.7, 0.702, 0.72.

2. −9 < −4 because −9 lies farther left.

3. $\frac{7}{12} = \frac{35}{60}$ and $\frac{3}{5} = \frac{36}{60}$, so $\frac{3}{5}$ is larger.

4. (2.4 + 5.8) ÷ 2 = 8.2 ÷ 2 = 4.1.

5. $2 \div 8 = \frac{1}{4} = 0.25$.

Common mistake to avoid

More decimal digits do not mean a larger value. 0.9 is greater than 0.125. Always compare place values.