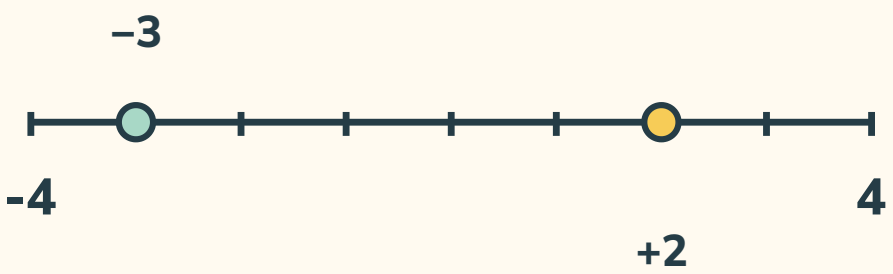
MATHS FIELD GUIDE · GRADE 6

Signed numbers describe direction and position

OPENING PROBLEM

Start at +2 and add −5. Where do you land?



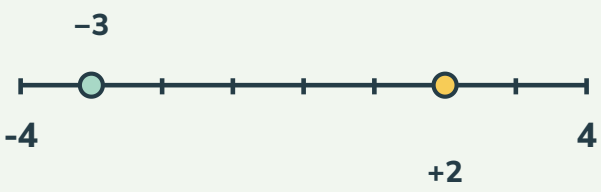
02 Use signs and inverse operations deliberately
03 Rules and worked cases
04 Track the freezer temperature
05 Locate, compare and bisect
06 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Use signs and inverse operations deliberately

The sign of the result depends on the operation and the numbers, not simply on which numeral is larger.

1



Start at +2 and add −5. Where do you land?

Five units left lands at −3.

2

−¾ + ½
↓
−3/4 + 2/4
↓
−1/4

Why does the result stay negative?

The negative amount has the greater magnitude.

3

−2 − (−5)
↓
−2 + 5
↓
3

What does subtracting a negative undo?

Removing a five-unit move left is a five-unit move right.

4

(−2/3) × (−9/4)
↓
18/12
↓
3/2

Which signs cancel?

Two negative factors give a positive product. Simplify the fraction to 3/2.

−3 × 2
−6.

−3 − (−2)
−1.

CHAPTER PROBLEM

Which is greater, −7 or −4? Explain using position.

−4 is greater because it lies to the right of −7 on the number line.

MATHS REFERENCE · GRADE 6

Signed numbers describe direction and position

A signed number has a value and a position relative to zero. Positive and negative numbers describe opposite sides of a chosen reference.

An integer is a whole-number value including zero and negative whole numbers. A negative sign identifies a negative value; subtraction describes an operation.

Four cases to recognise

Situation	What to do and why
−7 + 12	Move right twelve from −7. End at 5.
4 − (−3)	The gap from −3 up to 4 is seven.
Compare −9 and −2	−9 lies farther left and is smaller, although its distance from zero is greater.
Drop from −1 to −8	Final minus initial is −7. The drop has size seven degrees.

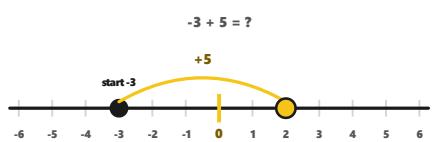
Read the model

Build the idea

Place −3 three units left of zero and +3 three units right. They are opposites and have equal distance from zero.

Moving right increases a number. Moving left decreases it. This ordering still applies when both numbers are negative.

Integer jumps



-3 + 5 = 2

Integers on a number line

Why it works

−2 is greater than −5 because it lies further right. Its distance from zero is smaller, but its numerical value is greater.

Adding a signed change combines a starting position with a directed movement. Five steps right from −3 ends at 2.

integer A positive or negative whole-number value, or zero.
opposite Same distance on the other side of zero.
absolute value Non-negative distance from zero.

27 28 **?** 30

Which number comes just before thirty?

Twenty-nine. One more makes three whole tens.

WORKED INVESTIGATION

Track the freezer temperature

At sunrise the freezer is at −4°C. A rise of seven degrees moves seven steps right on a number line, ending at 3°C.

Look at this part	What it tells you
Start	−4°C
Rise by 7°C	3°C
Fall by 5°C	−2°C

Work it through

The net change across both moves is +2°C, from −4°C to −2°C. The distance travelled on the temperature scale is 7 + 5 = 12 degrees.

Catch the mistake

A reading of −2°C is warmer than −4°C. The minus signs locate both readings below zero; the one farther right is warmer.

Compare the cases

Follow an example

A temperature begins at −3°C and rises by 5°C. The new temperature is −3 + 5 = 2°C.

A three-unit distance is non-negative. A position of −3 tells us which side of zero the point lies on.

What changes? What stays true?

Zero is neither positive nor negative. Choosing a reference and direction is part of a meaningful model.

Opposite numbers sum to zero. A gain of three and a loss of three cancel when measured in the same units.

Change one condition

From 3°C to −6°C the signed change is −9°C, while the size of the drop is nine degrees.

52 62 **?** 82

The jumps are equal. Fill the gap.

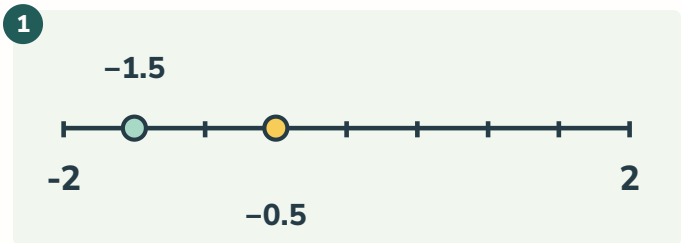
Each jump adds ten. The missing number is 72.

ILLUSTRATED PROBLEM SHEET

Locate, compare and bisect

Equal distances on a number line represent equal differences.

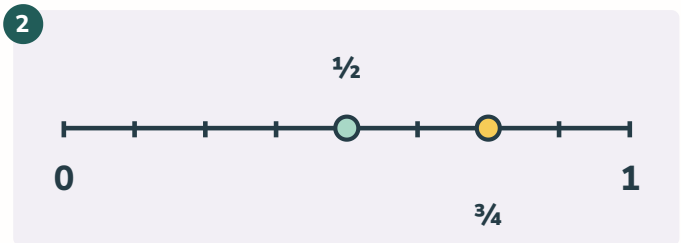
1



Which negative number is greater?

−0.5 lies to the right. Both are negative, but −0.5 is closer to zero.

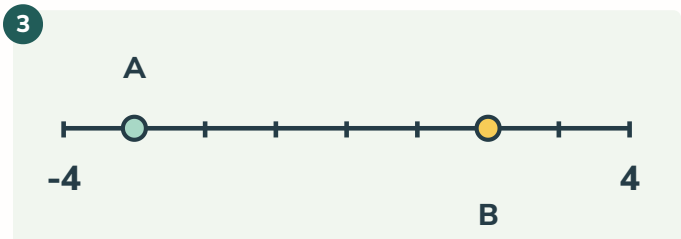
2



Find a rational number between the two marks.

Average 1/2 and 3/4 to obtain 5/8. It lies one eighth from each endpoint.

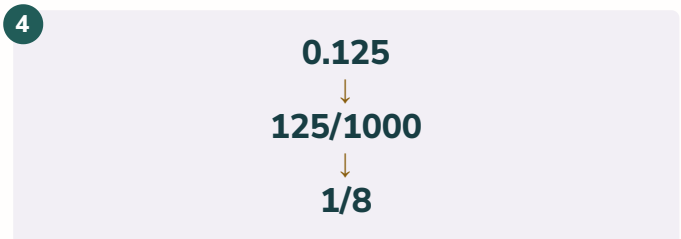
3



How far apart are A and B?

Cross zero: three units to zero and two more to B. Distance is five.

4



Is a terminating decimal a point on the rational line?

Yes. It equals a ratio of integers with nonzero denominator.

Between −1 and 0
−1/2 is one choice.

Between −1 and −1/2
−3/4 is one choice.

CHAPTER PROBLEM

A lift moves from floor −3 to floor +2. How far and in which direction does it travel?

It moves up 5 floors: three floors to reach 0, then two more.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 Which is farther from zero, −7/4 or 3/2?	Compare absolute values 1.75 and 1.5. The negative number is farther away.
02 Is there a last rational number before 1?	No. Given any rational r below 1, the midpoint (r + 1)/2 is another rational strictly between them.
03 A thermometer ends at −3°C after a drop of eight degrees. What was the initial temperature?	Undo the drop by adding eight. The initial reading was 5°C; 5 − 8 = −3.
04 A lift moves from floor −3 to 4, then back to −1. Net movement and total travel?	Net is +2 floors. Distances seven and five sum to twelve floors.
05 Which point is nearer zero, −8 or +6?	Compare distances eight and six. Positive six is closer.



Which marked number lies nearer to one hundred?

Eighty. It needs twenty more, while twenty needs eighty more.

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