What a Point Means

A proportional relationship always multiplies by the same number, the unit rate. Every point on its graph is a small story, and two of them, (0, 0) and (1, r), are the ones to know.

1 THE VOCABULARY
Words we use

Point a pair of numbers marking one spot.

Ordered pair (x, y) input first, then output.

Origin (0, 0) zero in gives zero out.

(1, r) the point that shows the unit rate.

- Watch out for these.
- Swapping x and y. Input first, then output.
- Reading a point without units. Say hours and dollars.
- Thinking r can be read at any point. Read it at x = 1, or divide y by x.
- Calling a point off the line a mistake in the graph. It is a pair the relationship does not make.

2 THE METHOD
Read a point

1. FRAME the point (x, y) means in x [input units], you get y [output units].
2. ORIGIN (0, 0): zero in, zero out. On every proportional graph.
3. UNIT RATE (1, r): one in gives r out. Go over to 1, up to the line.
4. ON OR OFF? multiply x by r. If you get y, the point is on the line.

WHY (1, R) SHOWS THE UNIT RATE

y = rx. Put in x = 1 and you get y = r × 1 = r. The output at an input of 1 is the unit rate itself.

3 JORDAN'S MOWING
y = 8x, hours across, dollars up

(3, 24)	in 3 hours, you get 24 dollars
(0, 0)	no mowing, no money: the origin
(1, 8)	in 1 hour, you get 8 dollars: the unit rate
(2.5, 20)	8 × 2.5 = 20, on the line; hours can be split
(4, 30)	8 × 4 = 32, not 30: off the line, not part of the job

THE EXIT TICKET

The car: (1, 28) means in 1 gallon, you get 28 miles. That is the unit rate, 28 miles per gallon.

SAY IT OUT LOUD

In x, you get y. The origin is zero for zero, and (1, r) is the unit rate.