Unit 3

Lesson 3 Summary

① description
② Equation
③ Table
④ Graph

Proportional relationships can be represented in multiple ways. Which representation we choose depends on the purpose. And when we create representations we can choose helpful values by paying attention to the context. For example, a stew recipe calls for 3 carrots for every 2 potatoes. One way to represent this is using an equation. If there are p potatoes and c carrots, then $c = \frac{3}{2}p$.

$y = \frac{3}{2}x$

$\frac{3 \text{ carrots}}{2 \text{ potatoes}} = \frac{3}{2} = \frac{y}{x}$

Suppose we want to make a large batch of this recipe for a family gathering, using 150 potatoes. To find the number of carrots we could just use the equation: $\frac{3}{2} \cdot 150 = 225$ carrots.

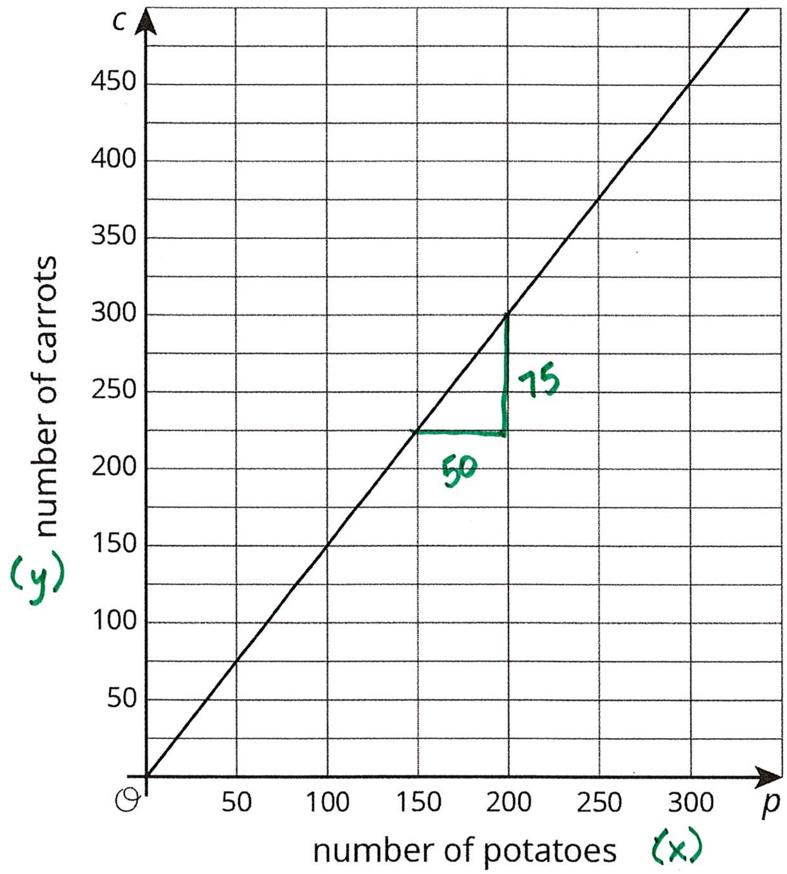
Now suppose the recipe is used in a restaurant that makes the stew in large batches of different sizes depending on how busy a day it is, using up to 300 potatoes at at time. Then we might make a graph to show how many carrots are needed for different amounts of potatoes. We set up a pair of coordinate axes with a scale from 0 to 300 along the horizontal axis and 0 to 450 on the vertical axis, because $450 = \frac{3}{2} \cdot 300$. Then we can read how many carrots are needed for any number of potatoes up to 300.

* 6 to 10 rule for intervals & scale

$300 \div 50 = 6$

biggest # — count by — answer must be between 6-10.

Or if the recipe is used in a food factory that produces very large quantities and the potatoes come in bags of 150, we might just make a table of values showing the number of carrots needed for different multiplies of 150.



(x) number of potatoes	(y) number of carrots
150 $\cdot \frac{3}{2}$ =	225
300	450
450	675
600	900

$\frac{75}{50} = \frac{3}{2}$

No matter the representation or the scale used, the constant of proportionality, $\frac{3}{2}$, is evident in each. In the equation it is the number we multiply p by; in the graph it the slope; and in the table it is the number we multiply values in the left column to get numbers in the right column. We can think of the constant of proportionality as a **rate of change** of c with respect to p. In this case the rate of change is $\frac{3}{2}$ carrots per potato.

Lesson 3 Glossary Terms

- rate of change