

# Formulas for Linear Functions

Chapter 1

Section 4

# Finding a Formula from Table Data

A grapefruit is thrown into the air. Its velocity,  $v$ , is a linear function of  $t$ , the time since it was thrown.

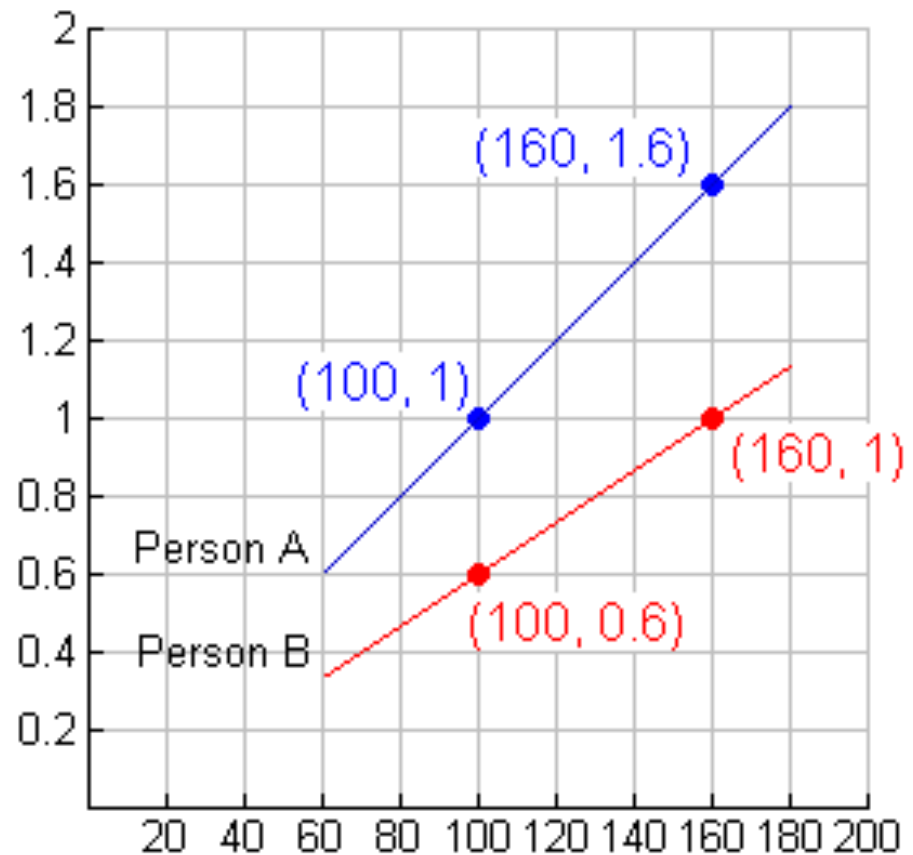
- 1) Check that the data in the table below corresponds to a linear function
- 2) Find a formula for  $v$  in terms of  $t$ .

$t$ , time (sec)	1	2	3	4
$v$ , velocity (ft/sec)	48	16	-16	-48

# Finding a Formula from a Graph

The graph pictured to the right shows oxygen consumption (liters/min) as a function of heart rate (beats/min) for two people.

- 1) Find a formula for each line.
- 2) Interpret the slope of each.

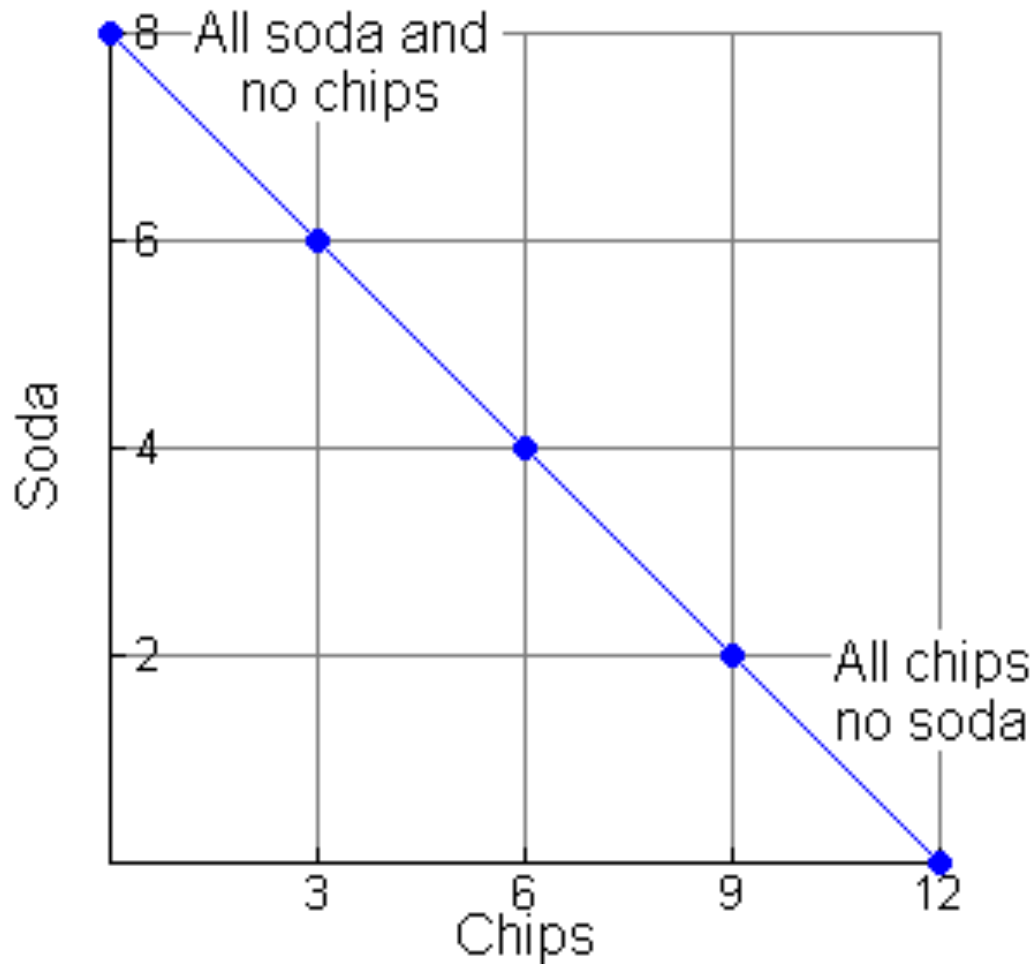


# Finding a Formula from a Verbal Description

We have \$24 to spend on soda and chips for a party. A six-pack of soda costs \$3 and a bag of chips costs \$2. The number of six-packs we can afford,  $y$ , is a function of the number of bags of chips we decide to buy,  $x$ .

- 1) Find an equation relating  $x$  and  $y$ .
- 2) Graph the equation. Interpret the intercepts and the slope in the context of the party.

# Finding a Formula from a Verbal Description



The slope tells us the change in the number of six-packs of soda/change in the number of bags of chips. Two fewer six-packs of soda results in 3 more bags of chips or 3 fewer bags of chips results in 2 more six-packs of soda.

# Alternate Forms for the Equation of a Line

The ***slope-intercept form*** is  $y = b + mx$ , where  $m$  is the slope and  $b$  is the  $y$ -intercept.

The ***point-slope form*** is  $y - y_0 = m(x - x_0)$ , where  $m$  is the slope and  $(x_0, y_0)$  is a point on the line.

The ***standard form*** is  $Ax + By + C = 0$ , where  $A$ ,  $B$ , and  $C$  are constants.

# Conversion Examples

- 1) Convert the equation  $5x - 3y + 2 = 0$  to the slope–intercept form.
- 2) Convert the equation  $y - 0.7 = 5(x - 0.2)$  to the slope–intercept form.
- 3) Convert the equation  $y - 0.7 = 5(x - 0.2)$  to the standard form.

## Find the Formulas for the Linear Functions Listed Below

- 1) Slope  $-4$  and  $x$ -intercept  $7$ .
- 2) Slope  $3$  and  $y$ -intercept  $8$ .
- 3) Slope  $\frac{2}{3}$  and passes through the point  $(5, 7)$ .
- 4) Has  $x$ -intercept  $3$  and  $y$ -intercept  $-5$ .
- 5) Function  $f$  has  $f(-2) = 7$  and  $f(3) = -3$ .



# Problem #43

Find the equation of the red line  $l$ , shown in the graph pictured to the right if it's slope is  $m = 4$ .

