

Lesson 13: Finding Equivalent Ratios Given the Total Quantity

$1 \text{ lb} = 16 \text{ oz}$

Classwork

Example 1

A group of 6 hikers are preparing for a one-week trip. All of the group's supplies will be carried by the hikers in backpacks. The leader decides that each hiker will carry a backpack that is the same fraction of weight to all the other hikers' weights. This means that the heaviest hiker would carry the heaviest load. The table below shows the weight of each hiker and the weight of the backpack.

Complete the table. Find the missing amounts of weight by applying the same value of the ratio as the first two rows.

let $B = \text{Backpack weight}$
 $H = \text{Hiker weight}$

$y = \frac{2}{21}x$

$B = \frac{2}{21}H$

$B = \frac{2}{21}(129 \frac{15}{16})$

$B = 12 \frac{3}{8}$

$B = \frac{2}{21}H$

$B = \frac{2}{21}(68 \frac{1}{4})$

$B = 6 \frac{1}{2}$

$B = \frac{2}{21}H$

$8 \frac{3}{4} = \frac{2}{21}H$

$H = 91 \frac{7}{16}$

$B = \frac{2}{21}H$

$\frac{10}{\frac{2}{21}} = \frac{2}{21}H$

Hiker's Weight H	Backpack Weight B	Total Weight (lb.)
152 lb. 4 oz. $152 \frac{1}{4}$	14 lb. 8 oz. $14 \frac{2}{3}$	$166 \frac{3}{4}$
107 lb. 10 oz. $107 \frac{5}{8}$	10 lb. 4 oz. $10 \frac{1}{2}$	$117 \frac{7}{8}$
129 lb. 15 oz. $129 \frac{15}{16}$	$12 \frac{3}{8}$	$142 \frac{5}{16}$
68 lb. 4 oz. $68 \frac{1}{4}$	$6 \frac{1}{2}$	$74 \frac{3}{4}$
$91 \frac{7}{8}$	8 lb. 12 oz. $8 \frac{3}{4}$	$100 \frac{5}{8}$
105	10 lb.	115
$168 \frac{21}{23}$	$16 \frac{7}{23}$	185
?	?	23

$k = \frac{2}{21}$

$\frac{14 \frac{2}{3}}{152 \frac{1}{4}} = \frac{2}{21}$

2nd ratio
 $\frac{\text{total}}{\text{backpack}} = \frac{115}{10} = 11.5$
 $T = 11.5 B$

$T = 11.5 B$
 $185 = 11.5 B$
 $\frac{185}{11.5} = B$
 $B = 16 \frac{2}{23}$