

Notes: Proportional Reasoning
 Created for you by Ms. Nhotsoubanh

Using Ratio Tables to find Equivalent Rates

Jaidan hikes $\frac{1}{2}$ mile every $\frac{1}{4}$ hour. Max hikes $\frac{1}{3}$ mile every $\frac{1}{6}$ hour.

How far do they hike in 2 hours? $\text{Rate} = \frac{\text{Distance}}{\text{Time}}$?

Jaidan's hike

Distance (mi)	$\frac{1}{2}$	1	$1\frac{1}{2}$	2 mi	4
Time (h)	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 hr T _{unit} rate	2

Max's hike

Distance (mi)	$\frac{1}{3}$	$\frac{2}{3}$	1	2 mi	4
Time (h)	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{2}$	1 T _{unit} rate	2

Write and solve a complex fraction for each hiker to determine the unit rate.

$(\text{Rate})(\text{Time}) = \frac{\text{Distance}}{\text{Time}}$
 $\text{Rate} = \frac{\text{Distance}}{\text{Time}}$

max
 $\text{Rate} = \frac{\text{Distance}}{\text{Time}}$

$\text{Rate} = \frac{\frac{1}{3} \text{ mi}}{\frac{1}{6} \text{ hr}}$

Rewrite

$\frac{1}{3} \cdot \frac{6}{1} = 2 \text{ mi/hr}$

Jaidan?
 $\text{Rate} = \frac{\frac{1}{2} \text{ mi}}{\frac{1}{4} \text{ hr}}$

rewrite complex fraction

$\frac{1}{2} \cdot \frac{4}{1} = 2 \text{ mi/hr}$

$2(2) = 4 \text{ miles in 2 hrs}$

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Name: _____
 Math 7H - Nov. 28
 HW: textbook p. 167 & 168 #s 20-24, 28, 30-32, p. 169 #s 40-43 use pages 36 - 38
 Glue on page 35

2. Shane mows $\frac{1}{6}$ acre in $\frac{1}{4}$ hour. How many acres does Shane mow in an hour?



$$\text{Rate} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Rate} = \frac{\frac{1}{6} \text{ acre}}{\frac{1}{4} \text{ hr}}$$

rewrite complex fraction

$$\frac{1}{6} \cdot \frac{4^2}{3} = \frac{2}{3} \text{ acre/hr}$$

simplify

4. Two bath tubs are being filled. Water enters the first tub at a rate of $\frac{2}{3}$ gallon per $\frac{1}{4}$ minute. Water pours into the second tub at a rate of $\frac{3}{5}$ gallon per $\frac{1}{6}$ minute. Determine which tub is being filled faster.



$$\text{Rate} = \frac{\text{Distance}}{\text{Time}}$$

first tub and tub

$$\text{rate} = \frac{\frac{2}{3} \text{ gal}}{\frac{1}{4} \text{ min}}$$

$$\text{Rate} = \frac{\frac{2}{3} \text{ gal}}{\frac{1}{4} \text{ min}}$$

$$\frac{2}{3} \cdot 4 = \frac{8}{3} \text{ gal/min}$$

$$\frac{3}{5} \cdot 4 = \frac{12}{5} \text{ gal/min}$$

Tub 2 is being filled faster.

3. Two containers filled with water are leaking. Container A leaks at a rate of $\frac{2}{3}$ gallon every $\frac{1}{4}$ hour. Container B leaks at a rate of $\frac{3}{4}$ gallon every $\frac{1}{3}$ hour. Determine which container is leaking more rapidly.



Container A

$$\text{Rate} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Rate} = \frac{\frac{2}{3} \text{ gal}}{\frac{1}{4} \text{ hr}}$$

Rewrite complex fraction

$$\frac{2}{3} \cdot 4 = \frac{8}{3} \text{ gal/hr}$$

or

$$2\frac{2}{3} \text{ gal/hr}$$

Container B

$$\text{Rate} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Rate} = \frac{\frac{3}{4} \text{ gal}}{\frac{1}{3} \text{ hr}}$$

$$\frac{3}{4} \cdot 3 = \frac{9}{4} \text{ gal/hr}$$

or

$$2.25 \text{ gal/hr}$$

Container A is leaking more rapidly because $2\frac{2}{3}$ gal is more than 2.25 gal.

5. The ratio table shows the costs for different amounts of artificial turf. Find the unit rate in dollars per square foot.

Amount (square feet)	25	100	400	1600
Cost (dollars)	100	400	1600	6400

$$\frac{\text{cost}}{\text{amount}} = \frac{100}{25} = 4 / 1 \text{ sq. ft.}$$

6. A communications satellite in orbit travels about 18 miles every 4 seconds. Complete the ratio table. Find the rate.

Time (seconds)	4	8	12	16	20
Distance (miles)	18	36	54	72	90

$$\text{Rate} = \frac{\text{Distance}}{\text{time}}$$

$$\text{Rate} = \frac{18 \text{ mi}}{4 \text{ sec}} = 4.5 \text{ mi/sec}$$

$$4.5(4) = 18$$

$$\text{Rate}(\text{Time}) = D$$

$$4.5(12)$$