

**Do Now**

1) At the busiest time of day at the grocery store, there were 32 customers in 4 lanes. Express this as a **unit rate** of customers per lane.

$$\frac{32 \text{ customers}}{4 \text{ lanes}} = \frac{8 \text{ customers}}{1 \text{ lane}}$$

2) Evaluate:  $\frac{3}{4} \div \frac{2}{5}$

$$\frac{3}{4} \times \frac{5}{2} = \frac{15}{8} = \frac{1\frac{7}{8}}$$

3) Which is the better buy: 58 water bottles for \$70 or 90 water bottles for \$108? Show all work.

$$\frac{\$70}{58} = \$1.21 \quad \frac{\$108}{90 \text{ bottles}} = \$1.20$$

$1.21 > 1.20$

**Lesson #23 - Unit Rate with Complex Fractions**

Fractions like  $\frac{20}{\frac{1}{2}}$  and  $\frac{\frac{1}{4}}{\frac{7}{10}}$  are called **complex fractions**.

Complex fractions are fractions with a numerator, denominator, or both that are also fractions. **COMPLEX FRACTIONS MUST BE SIMPLIFIED!!!!**

Example 1) Simplify the following:

$$\frac{4}{2} = 4 \div 2 = 2$$

A)  $\frac{\frac{1}{4}}{\frac{1}{2}}$

$$\frac{1}{4} \div \frac{1}{2} = \frac{1}{4} \cdot \frac{2}{1} = \frac{2}{4} = \frac{1}{2}$$

B)  $\frac{\frac{1}{4}}{\frac{7}{10}}$

$$\frac{1}{4} \div \frac{7}{10} = \frac{1}{4} \cdot \frac{10}{7} = \frac{10}{28} = \frac{5}{14}$$

Example 2) Josiah can jog  $1\frac{1}{3}$  miles in  $\frac{1}{4}$  of an hour. Find his average speed in miles per hour.

$$\frac{\text{mi}}{\text{hrs}} = \frac{\frac{4}{3} \text{ mi}}{\frac{1}{4} \text{ hr.}}$$

$$\frac{4}{3} \times \frac{4}{1} = \frac{16}{3}$$

$$5\frac{1}{3} \text{ miles per hour}$$

Example 3) Matt is spreading mulch in his yard. He spreads  $4\frac{2}{3}$  square yards in 2 hours. How many square yards can he mulch per hour?

$$2\frac{1}{3} \text{ square yards per hour}$$

$$\frac{14}{3} \div 2$$

$$\frac{14}{3} \cdot \frac{1}{2} = \frac{7}{3} = 2\frac{1}{3}$$

**Now, You Try!**

**Simplify the following.**

4)  $\frac{2}{\frac{2}{3}}$

$$\frac{2}{1} \div \frac{2}{3} = \frac{2}{1} \cdot \frac{3}{2} = \frac{3}{1} = 3$$

5)  $\frac{6}{\frac{1}{3}}$

$$\frac{6}{1} \times \frac{3}{1} = \frac{18}{1} = 18$$

6)  $\frac{2}{\frac{3}{7}}$

$$\frac{2}{3} \times \frac{7}{1} = \frac{14}{3}$$

7)  $\frac{\frac{2}{4}}{\frac{2}{1}}$

$$\frac{\frac{2}{4}}{2} = \frac{2}{4} \div \frac{2}{1} = \frac{2}{4} \times \frac{1}{2} = \frac{1}{4}$$

8) One lap around a dirt track is  $\frac{1}{3}$  mile. It takes Bryce  $\frac{1}{9}$  of an hour to ride one lap. What is Bryce's unit rate around the track?

$$\frac{1}{3} \div \frac{1}{9} = \frac{1}{3} \times \frac{9}{1} = \frac{9}{3} = 3 \text{ miles per hour}$$

9) Allyson can walk  $4\frac{1}{2}$  miles in  $1\frac{1}{2}$  hours. Find her average speed in miles per hour.

$$4\frac{1}{2} \div 1\frac{1}{2} = \frac{9}{2} \div \frac{3}{2} = \frac{9}{2} \cdot \frac{2}{3} = \frac{18}{2} \cdot \frac{1}{3} = 3 \text{ mph}$$

10) During her last workout, Izzy ran  $2\frac{1}{4}$  miles in 15 minutes. What is Izzy's unit rate?

$$2\frac{1}{4} \div \frac{1}{15} = \frac{9}{4} \div \frac{1}{15} = \frac{9}{4} \cdot \frac{15}{1} = \frac{135}{4} = 33\frac{3}{4} \text{ miles per min}$$

11) One tank is filling at a rate at  $\frac{3}{4}$  of a gallon per  $\frac{2}{3}$  of a minute. A second tank is filling at a rate of  $\frac{5}{8}$  of a gallon per  $\frac{1}{2}$  of a minute. Which tank is filling faster? Show work and explain.

Tank 1

$$\frac{3}{4} \div \frac{2}{3}$$

$$\frac{3}{4} \cdot \frac{3}{2} = 1\frac{1}{8} \text{ gal per min}$$

Tank 2

$$\frac{5}{8} \div \frac{1}{2}$$

$$\frac{5}{8} \cdot \frac{2}{1} = \frac{10}{8} = 1\frac{1}{4} \text{ gal per min}$$