

LESSON

38

Fractions and Mixed Numbers
on a Number Line

WARM-UP

Facts Practice: 90 Division Facts (Test D or E)

Mental Math: Name the relationship: Diana's mother's father is Diana's _____.

Count by 12's from 12 to 96. How many is 5 dozen?
... 6 dozen? ... 7 dozen?

- | | |
|---|------------------|
| a. Round 615 to the nearest hundred. | b. $700 + 800$ |
| c. 10×70 | d. 5×24 |
| f. 50% of 80¢ | g. 25% of 80¢ |
| i. 6×6 , $-6 \div 6$, $+1$, -6 | h. 10% of 80¢ |

Problem Solving:

Copy this addition problem and fill in the missing digits:

$$\begin{array}{r} _ _ \\ + \ 1 \\ \hline _ _ \end{array}$$

NEW CONCEPT

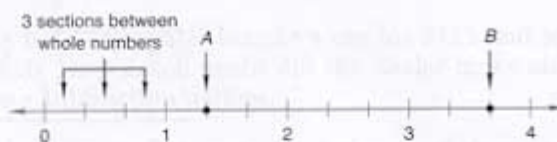
A number line is made up of a series of points. The points on the line represent numbers. On the number line below whole numbers are labeled. However, there are many numbers on the line that are not labeled. We mark some unlabeled numbers with arrows:



Many of the unlabeled points on a number line can be named with fractions and **mixed numbers**. Mixed numbers are numbers like $1\frac{1}{2}$ (one and one half) that are a whole number and a fraction together.

To identify a fraction or mixed number on a number line, we need to count the divisions between the whole numbers. On the number line below, the distance between every two whole numbers has been divided into three sections (into

thirds). Thus, each small section is one third ($\frac{1}{3}$). (Be careful to count the *sections* of the number line and not the marks that separate the sections.)

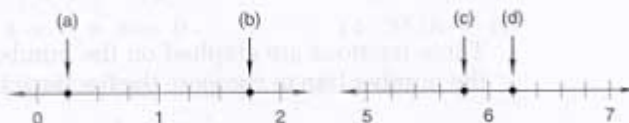


A point on a number line is named by its distance from zero. The location of the point marked by arrow *A* is given by the whole number 1 plus the length of one section. So the number for that point is $1\frac{1}{3}$. The point marked with arrow *B* is the whole number 3 plus the length of two sections. The number for point *B* is $3\frac{2}{3}$.

When reading from number lines with sections smaller than 1, follow these steps:

1. Find the whole-number distance from zero up to (but not past) the point to be named. This is the whole-number part of the answer.
2. Next, count the number of sections between whole numbers. This number is the denominator of the fraction.
3. Then count the number of sections past the whole number to the point being named. This is the numerator of the fraction.

Example 1 Name the fraction or mixed number marked by each arrow on these number lines:



Solution Point (a) is between 0 and 1, so it is named by a fraction and not by a mixed number. The distance between whole numbers on this number line is divided into fourths. Point (a) is one section from zero, which is $\frac{1}{4}$.

The distance from zero to point (b) is 1 plus the length of three sections, or $1\frac{3}{4}$.

The distance from zero to point (c) is 5 plus a fraction. The distance between whole numbers on this number line is divided into fifths. Point (c) is four sections from 5, which is $5\frac{4}{5}$.

The distance from zero to point (d) is 6 plus the length of one section, or $6\frac{1}{5}$.

Example 2 Here we show two number lines. On one number line the fraction $\frac{2}{3}$ is graphed. On the other number line $\frac{3}{4}$ is graphed.



Refer to these number lines to compare the fractions $\frac{2}{3}$ and $\frac{3}{4}$.

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

Solution Both $\frac{2}{3}$ and $\frac{3}{4}$ are greater than 0 but less than 1. Numbers to the right on the number line are greater than numbers to the left. So $\frac{3}{4}$ is greater than $\frac{2}{3}$.

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