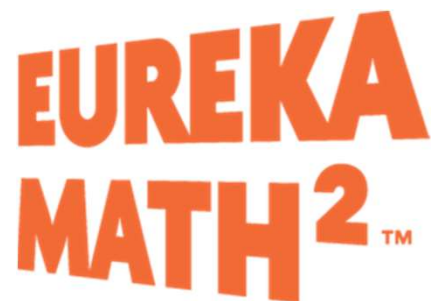




Module 5 - Lesson 15:

Solve multi-step word problems involving multiplication of mixed numbers.

CCSS Standard – 5.NF.B.6

FLUENCY (10-min)

Flip: Round

Round a number to the nearest **ONE** or **TENTH** or **HUNDREDTH** to build fluency with rounding decimals.

INSTRUCTIONS:

- With two partners, take an envelope of rounding cards (pages 127 & 129 of LEARN book).
- Place all the cards in a pile facedown.
- Take turns flipping over a card. All group members say the number aloud.
- Partner A says the number when **rounded to the nearest ONE**. Partner B says the number when **rounded to the nearest TENTH**. Partner C says the number when rounded to the nearest **HUNDREDTH**.
- Switch place values for the next card. Continue until all cards are used.

0.581

Partners A, B,C : “581 thousandths”

Partner A: “0.581 rounded to the **nearest one** is 1.”

Partner B: “0.581 rounded to the **nearest tenth** is 0.6”

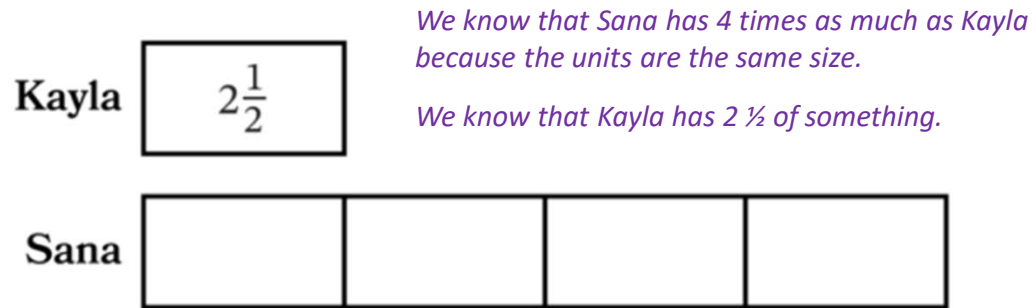
Partner C: “0.581 rounded to the **nearest hundredth** is 0.58”

LAUNCH (5-min)

Interpret a tape diagram representing a real-world situation with mixed numbers and multiple steps.

What information do we know from the tape diagram?

How do we know it?



What information is unknown?

We do not know what the situation is or what they all have.

We do not know what they all have together.

THINK-PAIR-SHARE:

Let's make an estimate. Whatever it is that they have, approximately how much of it do they all have together? How do you know?

What additional information do we know?

How do we know it?

We know that Tyler has more than both Kayla and Sana.

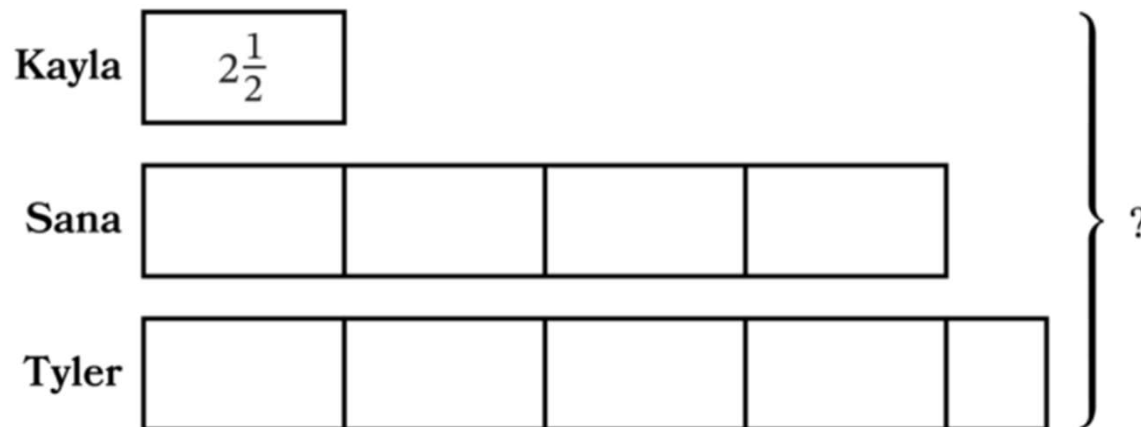
We know that Tyler has about $4\frac{1}{2}$ times as much as Kayla.

We know that Tyler has a $\frac{1}{2}$ unit more than Sana.

LAUNCH (5-min)

Interpret a tape diagram representing a real-world situation with mixed numbers and multiple steps.

With a partner, can you construct a **CONTEXT** that could apply to the tape diagrams?



They approximately 20 units ($9\frac{1}{2}$ units $\times 2\frac{1}{2}$; or $10 \times 2 = 20$)

Sana has $4 \times 2\frac{1}{2}$ or 10. or $4 \times 2.5 = 10$

Tyler has $4\frac{1}{2} \times 2\frac{1}{2}$ or $11\frac{1}{4}$ or $4.5 \times 2.5 = 11.25$

*$9\frac{1}{2}$ total units $\times 2\frac{1}{2}$ per unit = $23\frac{3}{4}$
Or $9.5 \times 2.5 = 23.75$*

Kayla, Sana and Tyler are making punch. Kayla uses $2\frac{1}{2}$ cups of juice. Sana uses 4 times as much juice as Kayla. Tyler uses $4\frac{1}{2}$ times as much juice as Kayla. How much juice do they all use together?

Kayla rides her bike $2\frac{1}{2}$ miles. Sana rides 4 times as far as Kayla. Tyler rides $4\frac{1}{2}$ times as far as Kayla. How far do they ride in total?

Today, we will solve multi-step word problems that involve multiplication of fractions and mixed numbers.

LEARN (35-min)**Multi-step Problem Stations**

There are four stations set up around the room (and posted here). Each station has a set of cards with one problem, and there is a different problem at each station. Make an **ESTIMATE** and **complete** the problem by using the Read-Draw-Write process. Record your work on pages 131 – 132 of your LEARN book.

Station 1

Tara prepares for a ballet recital. Last week she rehearsed $2\frac{1}{4}$ hours each day for 4 days. This week she rehearsed $1\frac{3}{4}$ hours each day for 3 days.

How many more hours did Tara rehearse last week than this week?

Station 2

On Saturday, a bakery sells $2\frac{4}{5}$ trays of chocolate doughnuts and $3\frac{1}{2}$ trays of glazed doughnuts. The bakery sells $2\frac{1}{2}$ times as many doughnuts on Sunday as on Saturday.

How many trays of doughnuts does the bakery sell on Sunday?

Station 3

Scott runs $1\frac{1}{2}$ miles. Eddie runs $3\frac{1}{2}$ times as far as Scott. Julie runs $\frac{3}{4}$ as far as Eddie.

How far does Julie run?

Station 4

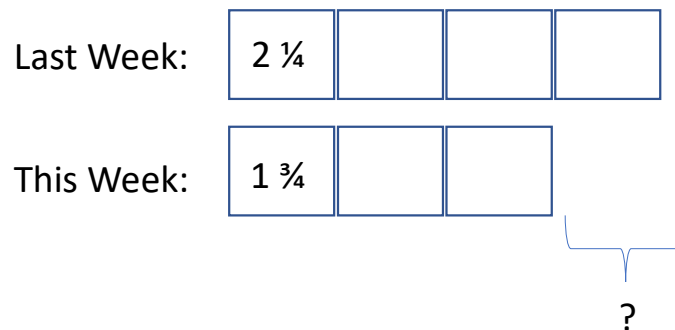
A glass company make 12 windows that measure $4\frac{3}{4}$ feet long by $3\frac{1}{3}$ feet wide and 7 windows that measure $2\frac{4}{5}$ feet long by 5 feet wide.

How many square feet of glass does the company need for windows?

LEARN (35-min)**Multi-step Problem Stations****Station 1 Solution:****Station 1**

Tara prepares for a ballet recital. Last week she rehearsed $2\frac{1}{4}$ hours each day for 4 days. This week she rehearsed $1\frac{3}{4}$ hours each day for 3 days.

How many more hours did Tara rehearse last week than this week?

**DECIMAL METHOD**

$$(2.25 \times 4) - (1.75 \times 3)$$

$$9 - 5.25$$

$$3.75$$

Estimate: $(2 \times 4) - (2 \times 3) = 2$ hours

Solution: $4 \times 2\frac{1}{2} = 4 \times \frac{9}{4}$
 $= 36/4$ or 9 hours

$3 \times 1\frac{3}{4} = 3 \times \frac{7}{4}$
 $= 21/4$ or $5\frac{1}{4}$ hours

$$9 \text{ hours} - 5\frac{1}{4} \text{ hours} = 3\frac{3}{4} \text{ hours}$$

LEARN (35-min)**Multi-step Problem Stations****Station 2 Solution:****Station 2**

On Saturday, a bakery sells $2\frac{4}{5}$ trays of chocolate doughnuts and $3\frac{1}{2}$ trays of glazed doughnuts. The bakery sells $2\frac{1}{2}$ times as many doughnuts on Sunday as on Saturday.

How many trays of doughnuts does the bakery sell on Sunday?

Saturday:

$2\frac{4}{5}$

$3\frac{1}{2}$

Sunday:

$2\frac{4}{5} + 3\frac{1}{2}$

Estimate: $(3 + 4) \times 2 = 14$

Solution:

$(2\frac{4}{5} + 3\frac{1}{2}) \times 2\frac{1}{2}$

$= (2\frac{8}{10} + 3\frac{5}{10}) \times 2\frac{1}{2}$

$= (5\frac{13}{10}) \times 2\frac{1}{2}$

$= 6\frac{3}{10} \times 2\frac{1}{2}$

$= (6 \times 2) + (3/10 \times 2) + (6 \times 1/2) + 3/10 \times 1/2$

$= 12 + 6/10 + 6/2 + 3/20$

$= 15\frac{15}{20} \text{ or } 15\frac{3}{4} \text{ trays}$

DECIMAL METHOD

$(2.8 + 3.5) \times 2.5$

6.3×2.5

15.75 trays

LEARN (35-min)

Multi-step Problem Stations

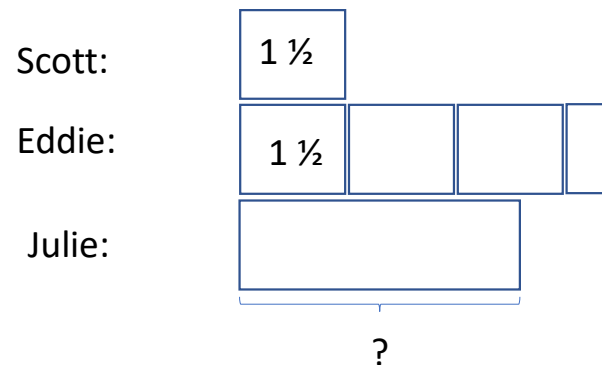


Station 3 Solution:

Station 3

Scott runs $1\frac{1}{2}$ miles.
Eddie runs $3\frac{1}{2}$ times
as far as Scott. Julie
runs $\frac{3}{4}$ as far as
Eddie.

How far does Julie
run?



Estimate: $1 \times 3 \times 1 = 3$

Solution: $1\frac{1}{2} \times 3\frac{1}{2} = \frac{3}{2} \times \frac{7}{2}$
 $= \frac{21}{4}$ or $5\frac{1}{4}$
 $= \frac{3}{4} \times 5\frac{1}{4}$
 $= (\frac{3}{4} \times 5) + (\frac{3}{4} \times \frac{1}{4})$
 $= \frac{15}{4} + \frac{3}{16}$
 $= \frac{60}{16} + \frac{3}{16}$
 $= \frac{63}{16}$ or $3\frac{15}{16}$ miles

DECIMAL METHOD

$$1.5 \times 3.5 = 5.25$$

Eddie runs 5.25 miles

$$.75 \times 5.25$$

$$3.9375$$

LEARN (35-min)

Multi-step Problem Stations

Station 4 Solution:

Station 4

A glass company make 12 windows that measure $4\frac{3}{4}$ feet long by $3\frac{1}{3}$ feet wide and 7 windows that measure $2\frac{4}{5}$ feet long by 5 feet wide.

How many square feet of glass does the company need for windows?

12 windows:

7 windows:

$2\frac{4}{5}$ ft

5 ft

$$\begin{aligned}\text{Estimate: } & (12 \times 5 \times 3) + (7 \times 3 \times 5) \\ & 180 + 105 = \mathbf{285}\end{aligned}$$

Solution:

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

$$= (4 + \frac{3}{4}) \times (3 + \frac{1}{3})$$

$$= (4 \times 3) + (4 \times \frac{1}{3}) + (\frac{3}{4} \times 3) + (\frac{3}{4} \times \frac{1}{3})$$

$$= 12 + \frac{4}{3} + \frac{9}{4} + \frac{3}{12}$$

$$= 12 + \frac{16}{12} + \frac{27}{12} + \frac{3}{12}$$

$$= 12 + \frac{46}{12}$$

$$= 15\frac{10}{12} \text{ or } 15\frac{5}{6} \text{ sq. ft}$$

$3\frac{1}{3}$ ft

$4\frac{3}{4}$ ft



$$\begin{aligned}& 2\frac{4}{5} \times 5 \\ &= (2 + \frac{4}{5}) \times 5 \\ &= (2 \times 5) + (\frac{4}{5} \times 5) \\ &= 10 + \frac{20}{5} \\ &= 10 + 4 \\ &= 14 \\ &= 7 \times 14 \\ &= \mathbf{98 \text{ sq. feet}}\end{aligned}$$

$$\begin{aligned}& 190 + 98 = \mathbf{288} \\ & \text{sq. feet}\end{aligned}$$

$$\begin{aligned}&= 12 \times 15\frac{5}{6} \\ &= (12 \times 15) + (12 \times \frac{5}{6}) \\ &= 180 + \frac{60}{6} \\ &= 180 + 10 \\ &= \mathbf{190 \text{ sq. feet}}\end{aligned}$$

LEARN (35-min)

Station 4 Solution:

Station 4

A glass company make 12 windows that measure $4\frac{3}{4}$ feet long by $3\frac{1}{3}$ feet wide and 7 windows that measure $2\frac{4}{5}$ feet long by 5 feet wide.

How many square feet of glass does the company need for windows?

Multi-step Problem Stations

12 windows:

7 windows:

$2\frac{4}{5}$ ft

5 ft

$3\frac{1}{3}$ ft

$4\frac{3}{4}$ ft

DECIMAL METHOD

$$12 \times (3.333 \times 4.75)$$

$$= 12 \times (15.83175)$$

$$= 189.981$$

$$7 \times (5 \times 2.8)$$

$$7 \times 14$$

$$98$$

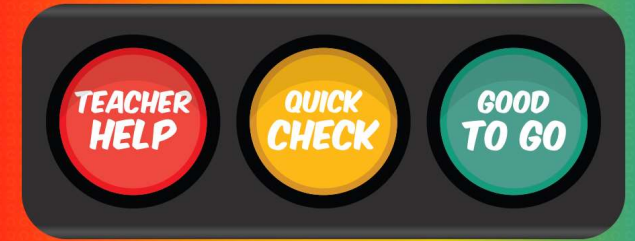
$$190 + 98 = 288$$

sq. feet



LAND (10-min)

Exit Ticket



Name

Date



15

Use the Read–Draw–Write process to solve the problem.

One batch of recipe A uses $1\frac{3}{4}$ cups of milk. One batch of recipe B uses $4\frac{3}{4}$ cups of milk. Noah makes $4\frac{1}{2}$ batches of recipe A and 2 batches of recipe B. How much milk does Noah use?

Exit Ticket – PAGE 135

Small Group Time:

Problem Set Pages 133 - 134

Homework:

Page 95 APPLY BOOK