LEARNING OBJECTIVE: We will solve problems involving fractional markups and markdowns. (G7M1L9)

CONCEPT DEVELOPMENT:

Markdown: The difference between the original sales price, and the discounted sales price is a markdown.
Example: Holiday decorations originally on sale for $10 are marked down by half now sell for $5.

Discount: The process of reducing the price of a good to sell more units.

Markup: The difference between the seller's cost for a product and the sales price paid by a customer.
Example: 7-11 buys Doritos at $0.80 each and marks them up by $\frac{1}{4}$ and sells them $1.00 each.

**Profit**: the amount of money that a seller makes for selling a good or service.

Commission: An amount paid to a salesperson for making a sale of an item. This is typically a percentage or fraction of the sale price of the item.
Example: A realtor gets a commission of $\frac{3}{100}$ of the sale price of a home.

Ways to Solve Problems Involving Markups and Markdowns
Example: A pair of shoes originally on sale for $40 is sold at $\frac{1}{4}$ off of the original price.

1. Tape Diagrams

$40 → ORIGINAL PRICE

| $10 | $10 | $10 | $~~$10~~ |

$30 Sale Price $10 markdown.
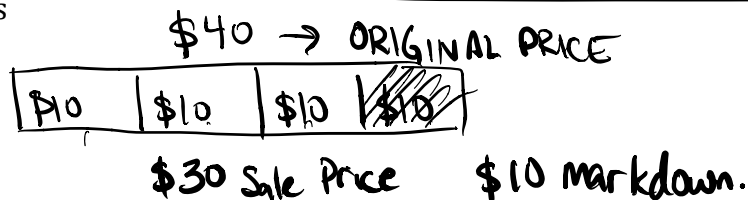
2. Find the markdown/markup and adjust from original price.

$$40 - \left(\frac{1}{4} \cdot 40\right) = 40 - 10 = $30$$

ORIG. PRICE − (FRACTION DISCOUNT · ORIG PRICE)

3. Find the fractional part of the price being paid and multiply by the original price.

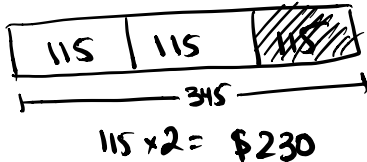$$40 \cdot \left(1 - \frac{1}{4}\right) \qquad 40 \cdot \frac{3}{4} = $30$$

ORIG. PRICE · (1 − FRAC. DISCOUNT)

Guided Practice:

Steps for Finding Markups and Markdowns Involving Fractions
1. Read the problem carefully and decide which method you will use to solve the problem.
2. A tape diagram might be the best if the fraction is easy to break into parts (i.e. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$)
3. Find the fractional amount of the markup/markdown and subtract it from the original price.

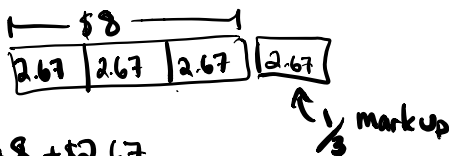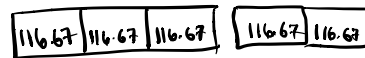|	
Mark down A bicycle shop had a sale where all mountain bikes were $\frac{1}{3}$ off the original price. How much is the sale price of a bike that originally costs $345? 115 ‖ 115 ‖ 115 ⊢— 345 —⊣ 115 × 2 = $230 or 345 − ($\frac{1}{3}$·345) 345 − 115 = $230 or 345 · (1 − $\frac{1}{3}$) 345 · $\frac{2}{3}$ = $230	Aeropostale is having a sale—all shorts are marked down by $\frac{2}{5}$ from their original price. If shorts are normally sell for $35, what is the discounted price? 35 ÷ 5 = $7 7 ‖ 7 ‖ 7 ‖ 7 ‖ 7 $\frac{2}{5}$ $21
Mark up Amazon buys a book from a publisher for $8.00. They then mark it up by $\frac{1}{3}$ and then sell it online to you and me. How much are we charged for the book? ⊢— $8 —⊣ 2.67 ‖ 2.67 ‖ 2.67 ‖ 2.67 ↑ $\frac{1}{3}$ markup $8 + $2.67 $10.67 or 8 · (1 + $\frac{1}{3}$) = 8 · $\frac{4}{3}$ = $10.67	It costs Apple about $350 to make an iPhone. They mark these costs by $\frac{2}{3}$ and then sell it at their retail stores and online. How much are we paying for a phone? 116.67 ‖ 116.67 ‖ 116.67 ‖ 116.67 ‖ 116.67 116.67 × 5 = $583.35 350 + 116.67 + 116.67 350 × $\frac{5}{3}$ = $583.34
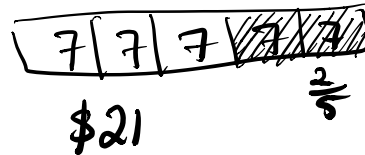
Commission

Janie and John sold a house in Mountain View for $875,000 and received a commission equal to $\frac{1}{32}$ of the selling price. How much did they earn from selling the house?

Janie & John's Commission

$\frac{1}{32} \times 875,000$

$875,000 \div 32$

$27,343.75 Commission earned

For every HDTV Wyatt sells, he earns a commission equal to $\frac{1}{8}$ of his total sales. For the month of December, he sold $9,400 worth of HDTVs. How much commission did he earn? WHITEBOARD

$9400 \times \frac{1}{8} = \frac{9400}{8}$

$= $1175 Commission

Commission

Mark up then Mark down

A furniture store is having a sale, but before they advertise their sale, they decide to mark up a couch by $\frac{1}{3}$. Then, they sell the couch at a price that is discounted by $\frac{1}{5}$ off of the marked up price. If the original price is $2,400, how much money will the store make?

$2400   ① $\frac{1}{3}$ mark up
② $\frac{1}{5}$ markdown.

$2400 \div 3 = 800$
$2400 + 800 = 3200 (Marked up price)

$3200 \div 5 = 640$
$3200 - 640$ $2560 Couch

3200
| 640 | 640 | 640 | 640 | 640 |

$4 \times 640 = $2560.

Before the holiday season, many stores raise their prices in anticipation of Christmas sales. A 55 inch TV at Best Buy was originally $1,250. It was first marked up by $\frac{2}{5}$, and then discounted by $\frac{1}{4}$. What was the new price?

✗WHITEBOARD✗

$1250 \times \frac{2}{5} = 500$

$1250 + 500 = $1,750 ← MARKED UP PRICE

$1750 \div 4 = 437.50$

$437.50 \times 3 = $1312.50

$\begin{array}{r} 1750.00 \\ 437.50 \\ \hline 1312.50 \end{array}$

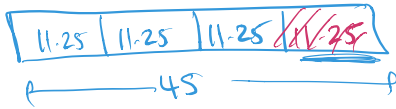$1312.50

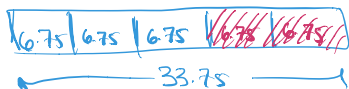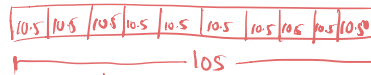|	
Mark down then more Mark down Abercrombie is having an end of season sale. A pair of jeans that was originally $45 had been marked down by $\frac{1}{4}$ and then marked down by another $\frac{2}{5}$. What is the new sale price?	Macy's had a sale on sweaters. Sweaters that were $150 originally were discounted by $\frac{3}{10}$. When I was going to pay, the clerk said I could get an additional $\frac{1}{10}$ off if I opened up a Macy's credit card. I did it. How much money did I save all together?

$45 \times \frac{3}{4}$

$33.75 \times \frac{3}{5}$

| 11.25 | 11.25 | 11.25 | 11.25 |

|← 45 →|

$3 \times 11.25 = \$33.75$

Marked down another $\frac{2}{5}$

| 6.75 | 6.75 | 6.75 | 6.75 | 6.75 |

|← 33.75 →|

$6.75 \times 3 = \$20.25$ SALE PRICE

ON YOUR OWN

| 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

|← 150 →|

$7 \times 15 = \$105$

| 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 |

|← 105 →|
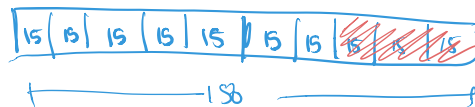
$108.00^{\,4}$
$-\ 10.50$
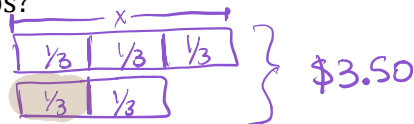94.50 PAID FOR SWEATER.

150.00
-94.50 $\boxed{\$55.50}$ saved

|	
Original Price Unknown Office Depot pays a certain amount for paper clips. They then mark up the price by $\frac{2}{3}$ and sell a box for $3.50. How much did they originally pay for the paper clips?	A motorcycle dealer paid a certain price for a motorcycle and then marked it up by $\frac{1}{5}$ of the price he paid. If he sold the bike for $14,000, how much was the original price? ON YOUR OWN

|← x →|
| ⅓ | ⅓ | ⅓ |
| ⅓ | ⅓ | $\}$ $3.50

$3.50 \div 5 = .70 \times 3 = \$2.10$

$\boxed{\text{ORIGINAL PRICE} : \$2.10}$

$3\frac{1}{2} \div \frac{5}{3}$

$\frac{7}{2} \div \frac{5}{3} = \frac{7}{2} \cdot \frac{3}{5} = \frac{21}{10} = \$2.10$

|← x →|
| ⅕ | ⅕ | ⅕ | ⅕ | ⅕ | ⅕ | = $14,000
  ↑ ↑ ↑ ↑ ↑ ↑
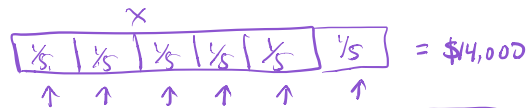
$14000 \div 6 = 2,333.33$
      $\times\ \ \ \ \ 5$
   $\boxed{\$11,666.65}$

$\$11,200$ would be dividing by 5

Independent Practice:

Ashley earns a base salary of \$350, and then makes a commission of $\frac{1}{10}$ of everything she sells. If she sold \$2,200 worth of items last week, how much did she earn in total?	Russell's Furniture store paid a woodworker \$93 for a coffee table and then marked it up $\frac{17}{20}$. How much did they charge for the coffee table?
Paula bought a new pair of glasses. They were originally \$72, but then they were discounted by $\frac{3}{10}$. How much did Paula pay for the glasses?	Daniela is buying kiwi fruit. She pays \$18 for the kiwi fruit. She is really happy because she got a discount of $\frac{2}{10}$. She wants to know how much she actually saved. Help her out.

Caterina is shopping at the mall, and sees a pair of earrings that she is excited about getting. The earrings were originally priced at $45, but were discounted by $\frac{1}{5}$, and then discounted another $\frac{1}{5}$ from that price because of a one-day sale. What was the price that Caterina paid for the earrings?	Cielo is selling cable knit sweaters. She pays $27 for the supplies and then marks up the cost by $\frac{2}{3}$. How much did she charge for the sweaters?
Sears pays $160 for a table saw. They then mark it up by $\frac{3}{4}$. If they discount the marked up price by $\frac{1}{3}$, how much money are they making when they sell a table saw?	Big Fish Games is having a sale on downloads. A game normally priced at $40 is available at a $\frac{1}{5}$ discount. They are also running a special from 9AM-10AM where they will give customers an additional $\frac{1}{3}$ discount. How much money will you save if you buy between 9AM and 10AM?

Activating Prior Knowledge:

We can use tape diagrams to divide and multiply.

Use a tape diagram to determine what $\frac{4}{5}$ of 140 is.	Use a tape diagram to determine what $\frac{1}{6}$ of 132 is.

Closure:

Give out Exit Ticket for Lesson 14.

Teacher Notes:

This accompanies lesson 14 for Module 1, Grade 7.
Homework is problem set for lesson 14, or independent practice could be HW.