

7.3f Word problems

Objective

- Solve word problems involving division of decimals.

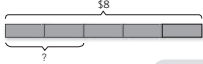
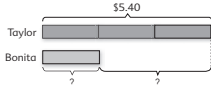


Common Core State Standard

4.MD.2

Mathematical Practices

- MP1
- MP4
- MP7

Word problems involving division of decimals	Textbook, pp. 63–64
<ul style="list-style-type: none"> Have students refer to Tasks 23–26 on pages 63–64 of the Textbook to discuss word problems involving division of decimals. Make sure that students are able to relate the word problems to the bar models on these pages. In each of the models, the parts are equal units. A major strategy in solving these types of word problems is to find the value that one unit represents. In problems that involve division as a first step, we are usually given either the total or the value of several units and need to first find the value of 1 unit. Task 23: One unit represents the cost of 1 packet of dates. All units are the same since each packet costs the same. We need to find the value that 1 unit represents. <p>5 units = \$8 1 unit = $\\$8 \div 5 = \\1.60 2 units = $\\$1.60 \times 2 = \\3.20</p> <p>Answer: 23. 3.20</p>	<p>23. Ellie bought 5 packets of dates for \$8. How much did two packets cost?</p>  <p>First, I find the cost of each packet.</p> <p>$\\$8 \div 5 = \\1.60</p> <p>Each packet cost \$1.60. Two packets cost $\\$1.60 \times 2 = \\$ <input type="text"/></p>
<ul style="list-style-type: none"> Task 24: The shorter bar is 1 unit of money (Bonita's). The longer bar represents 3 times as much money (Taylor's), and is therefore 3 units. <p>3 units = \$5.40 1 unit = $\\$5.40 \div 3 = \\1.80</p> <p>We can find how much more one has than the other by subtraction, as shown in the Textbook. If we have the unit value, we may also use multiplication.</p> <p>2 units = $\\$1.80 \times 2 = \\3.60</p> <p>You can also ask how much money they have altogether.</p> <p>4 units = $\\$1.80 \times 4 = \\7.20 or: $\\$5.40 + \\$1.80 = \\$7.20$</p> <p>Answer: 24. 3.60 3.60</p>	<p>24. Taylor has \$5.40. He has 3 times as much money as Bonita. How much more money does Taylor have than Bonita?</p>  <p>First, I find the amount of money Bonita has.</p> <p>$\\$5.40 \div 3 = \\1.80</p> <p>Bonita has \$1.80. $\\$5.40 - \\$1.80 = \\$ <input type="text"/></p> <p>Taylor has \$ <input type="text"/> more than Bonita.</p> <p>63</p>

- Task 25: We can show the total volume of orange juice as one long bar. We divide the bar into two parts; the part that filled up the bottles, and the part left. Since Steve filled 5 bottles of the same size, and we know the amount of orange juice left, we can subtract the amount left first to find the total amount of orange juice in the 5 bottles, then divide the amount by 5 equal units.

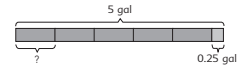
$$5 \text{ units} = 5 - 0.25 = 4.75$$

$$1 \text{ unit} = 4.75 \div 5 = 0.95$$

Answer:

25. 0.95
0.95

25. Steve bought 5 gal of orange juice. After filling up 5 bottles of the same size with the orange juice, he had 0.25 gal of orange juice left. Find the amount of orange juice in each bottle.



First, I find the total amount of orange juice in 5 bottles.



$$5 - 0.25 = 4.75$$

The total amount of orange juice in 5 bottles was 4.75 gal.

$$4.75 \div 5 = \square$$

The amount of orange juice in each bottle was \square gal.

- Task 26: Have students illustrate this problem with a diagram and ask them to share their solutions.
- A possible solution is as follows:
We can draw two bars of the same length to represent the total amount of flour. Divide one bar into fourths, for the amount of flour in each packet. Divide the other bar into fifths, for the amount of flour in each cake. First, we find the total amount of flour, using the first bar, then use that to find the value each unit represents in the second bar.

Answer:

26. 1.08
1.08

26. Mrs. Kim used 4 bags of flour to make 5 cakes of the same size. Each bag contained 1.35 kg of flour. How much flour did she use for each cake?

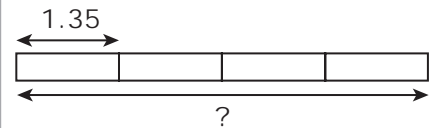
$$1.35 \times 4 = 5.4$$

4 bags contained 5.4 kg of flour.

$$5.4 \div 5 = \square$$

Mrs. Kim used \square kg of flour for each cake.

64



$$1 \text{ unit (packet)} = 1.35 \text{ kg}$$

$$4 \text{ units (packets)} = 1.35 \text{ kg} \times 4$$

$$= 5.4 \text{ kg}$$

$$5 \text{ units (cakes)} = 5.4 \text{ kg}$$

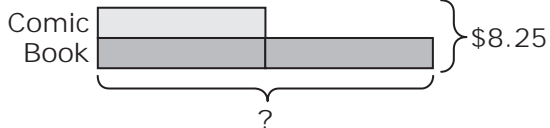
$$1 \text{ unit (cake)} = 5.4 \div 5$$

$$= 1.08 \text{ kg}$$

Assessment

- Have students solve the problems individually. Whenever necessary, encourage students to draw models to help them understand and to solve the problems. Then have them discuss with their partners. Ask some students to share their solutions and models.

Answers:

27. $6 \div 4 = 1.5$
There was 1.5 qt of syrup in each bottle.
28. $6.75 \div 5 = 1.35$
Each piece is 1.35 yd long.
29. $47.6 \div 4 = 11.9$
Her Mrs. Wells's mass is 11.9 kg.
30. Mass of 6 bars of chocolate:
 $2.34 - 0.06 = 2.28$
Mass of 1 bar of chocolate:
 $2.28 \div 6 = 0.38$
The mass of 1 bar of chocolate is 0.38 kg.
31. Cost of 3 pencils:
 $\$2.20 - \$0.85 = \$1.35$
Cost of 1 pencil:
 $\$1.35 \div 3 = \0.45
Each pencil cost \$0.45.
32. Amount saved in 1 week:
 $\$10.50 \div 3 = \3.50
Amount Sharon will save in 8 weeks:
 $\$3.50 \times 8 = \28
Sharon will save \$28 in 8 weeks.
33. Cost of 1 apple at the sale:
 $\$2.20 \div 4 = \0.55
Difference in cost:
 $\$0.60 - \$0.55 = \$0.05$
An apple is \$0.05 cheaper at the sale.
34. 
- 3 units = \$8.25
1 unit = $\$8.25 \div 3 = \2.75
2 units = $\$2.75 \times 2 = \5.50
The book cost \$5.50.

Textbook, p. 65

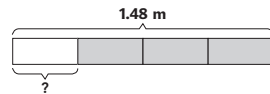
27. Mrs. King poured 6 qt of syrup equally into 4 bottles. How much syrup was there in each bottle?
28. A ribbon 6.75 yd long is cut into 5 equal pieces. How many yards long is each piece?
29. Mrs. Wells has a mass of 47.6 kg. She is 4 times as heavy as her daughter. What is her daughter's mass?
30. The mass of a box containing 6 bars of chocolate is 2.34 kg. The mass of the empty box is 0.06 kg. Find the mass of one bar of chocolate.
31. Janet bought 3 pencils and a pen for \$2.20. If the pen cost \$0.85, how much did each pencil cost?
32. Sharon saved \$10.50 in 3 weeks. If she saves the same amount each week, how much will she save in 8 weeks?
33. The usual price of an apple is \$0.60. At a sale, a bag of 4 apples is sold for \$2.20. How much cheaper is an apple at the sale?
34. Maria paid \$8.25 for a book and a comic. The book cost twice as much as the comic. Find the cost of the book.

Textbook 20, pages 61–63

65

EXERCISE 20

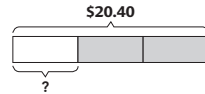
1. Jane cuts a rope 1.48 m long into 4 equal pieces. Find the length of each piece.



$$1.48 \text{ m} \div 4 = 0.37 \text{ m}$$

The length of each piece of rope is 0.37 m.

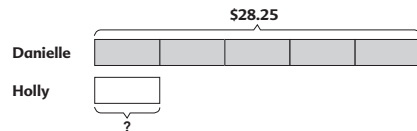
2. Mr. Gray paid \$20.40 for 3 kg of shrimp. Find the cost of 1 kg of shrimp.



$$\$20.40 \div 3 = \$6.80$$

1 kg of shrimp cost \$6.80.

3. Danielle spent \$28.25 at a bookshop. She spent 5 times as much as Holly. How much did Holly spend?



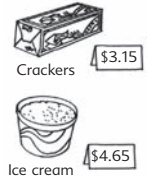
$$\$28.25 \div 5 = \$5.65$$

Holly spent \$5.65.

Unit 7: The Four Operations of Decimals

81

4. Gwen and Susan bought a box of crackers and a tub of ice cream. They shared the cost equally. How much did each girl pay?



$$\text{Total cost: } \$3.15 + \$4.65 = \$7.80$$

$$\text{Cost per person: } \$7.80 \div 2 = \$3.90$$

Each girl paid \$3.90.

5. Elijah bought 5 kg of grapes. He gave the cashier \$50 and received \$18.75 change. Find the cost of 1 kg of grapes.

$$\text{Cost of 5 kg of grapes: } \$50 - \$18.75 = \$31.25$$

$$\text{Cost of 1 kg of grapes: } \$31.25 \div 5 = \$6.25$$

1 kg of grapes cost \$6.25.

Unit 7: The Four Operations of Decimals

82

6. The total weight of 5 blocks of butter and a bag of flour is 2.7 lb. If the weight of the bag of flour is 1.2 lb, find the weight of each block of butter.

$$\text{Weight of 5 blocks of butter: } 2.7 \text{ lb} - 1.2 \text{ lb} = 1.5 \text{ lb}$$

$$\text{Weight of each block of butter: } 1.5 \text{ lb} \div 5 = 0.3 \text{ lb}$$

Each block of butter weighs 0.3 lb.

7. A painter mixed 10.5 L of white paint with 15.5 L of red paint. She poured the mixture equally into 4 cans. How much paint was there in each can?

$$\text{Total amount of paint: } 10.5 \text{ L} + 15.5 \text{ L} = 26 \text{ L}$$

$$\text{Amount of paint per can: } 26 \text{ L} \div 4 = 6.5 \text{ L}$$

There was 6.5 L of paint in each can.

Unit 7: The Four Operations of Decimals

83