Investigation 4

ACE Assignment Choices

Differentiated Instruction — Solutions for All Learners

Problem 4.1
Core 1, 2, 24–29
Other *Applications* 3, 4

Problem 4.2
Core 5–8, 30–34
Other *Applications* 9–10, *Connections* 35; unassigned choices from previous problems

Problem 4.3
Core 11–14
Other *Connections* 36, 37; unassigned choices from previous problems

Problem 4.4
Core 15–23
Other *Connections* 38, 39; *Extensions* 40; unassigned choices from previous problems

Adapted For suggestions about adapting Exercise 1 and other ACE exercises, see the CMP *Special Needs Handbook.*
Connecting to Prior Units 30, 35, 38: *Bits and Pieces I*

Applications

1. a. $20 \div \frac{1}{4} = 80$ muffins

b. $20 \div \frac{2}{4} = 40$ muffins

c. $20 \div \frac{3}{4} = 26\frac{2}{3}$ muffins

d. $20 \div \frac{1}{10} = 200$ muffins

e. $20 \div \frac{2}{10} = 100$ muffins

f. $20 \div \frac{7}{10} = 28\frac{4}{7}$ muffins

g. $20 \div \frac{1}{7} = 140$ muffins

h. $20 \div \frac{2}{7} = 70$ muffins

i. $20 \div \frac{6}{7} = 23\frac{1}{3}$ muffins

j. Since the muffins made when using $\frac{2}{7}$ of a cup of flour are twice as large as the muffins made when using $\frac{1}{7}$ of a cup of flour, you will need twice as much flour. But you don't have twice as much flour; you only have one bag. You will have to make half a recipe, which yields half as many muffins. If you make muffins using $\frac{6}{7}$ of a cup of flour, it takes six times as much flour as the muffins made with $\frac{1}{7}$ of a cup. If it takes six times as much flour, you will only be able to make $\frac{1}{6}$ the number of muffins as the recipe with $\frac{1}{7}$ of a cup or $140 \div 6 = 23\frac{1}{3}$ muffins.

2. a. $6 \div \frac{3}{5} = 10$ **b.** $5 \div \frac{2}{9} = 22\frac{1}{2}$

c. $3 \div \frac{1}{4} = 12$ **d.** $4 \div \frac{5}{8} = 6\frac{2}{5}$

3. a. No. $16 \div \frac{3}{4} = \frac{64}{4} \div \frac{3}{4} = 21\frac{1}{3}$ pizzas. He has enough flour to make 21 complete pizzas and $\frac{1}{3}$ of another pizza.

b. $5\frac{1}{4} \div 12 = \frac{21}{4} \div 12 = \frac{21}{4} \div \frac{48}{4} = \frac{21}{48}$ or $\frac{7}{16}$ ounce of parsley

c. 3 yards is 108 inches.
$108 \div 18\frac{3}{8} = 108 \div \frac{147}{8} = \frac{864}{8} \div \frac{147}{8}$, which is $\frac{864}{147}$ or $\frac{288}{49} = 5\frac{43}{49}$.
The remainder tells us that Ms. Jones can make 5 complete frames and $\frac{43}{49}$ of another frame, or Ms. Jones can make 5 complete frames and will have $16\frac{1}{8}$ in. of molding left over.

4. a. $5 \div \frac{1}{4} = 20$ **b.** $5 \div \frac{1}{8} = 40$

c. $5 \div \frac{1}{16} = 80$

Possible explanation: In each case, the divisor is half of the previous divisor. This means that twice as many can be found in 5. For example, $5 \div \frac{1}{4} = 20$. In the next problem you are dividing by eighths and eighths are half the size of fourths so twice as many can go into 5.

5. a. $\frac{1}{2} \div 8 = \frac{1}{16}$ pound per student

b. $\frac{1}{4} \div 4 = \frac{1}{16}$ pound per student

c. $\frac{3}{4} \div 3 = \frac{1}{4}$ pound per student

d. $\frac{4}{5} \div 10 = \frac{4}{50}$ or $\frac{2}{25}$ pound per student

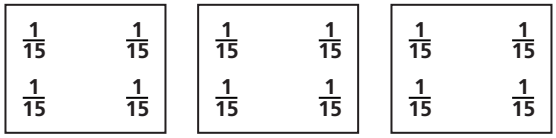
e. $1\frac{1}{2} \div 2 = \frac{3}{4}$ pound per student

6. a. $5\frac{1}{3} \div 4 = 1\frac{1}{3}$ gallons per trip

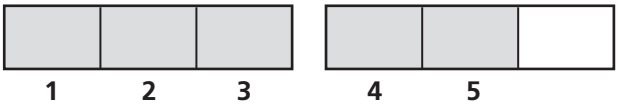
b. $28 \times 1\frac{1}{3} = 37\frac{1}{3}$ mi

7. D

8. a. $\frac{4}{5} \div 3 = \frac{4}{15}$; Possible diagram: This diagram is made by renaming $\frac{4}{5}$ as $\frac{12}{15}$. Since there are 12 fifteenths, you can divide by 3 or group the fifteenths into 3 groups. Each of the three groups will have 4 fifteenths in it.



b. $1\frac{2}{3} \div 5 = \frac{1}{3}$; Possible diagram: This diagram shows $1\frac{2}{3}$ as 5 thirds. Since you are dividing by 5, you can make 5 groups. Each group will have $\frac{1}{3}$ in it.



c. $\frac{5}{3} \div 5 = \frac{1}{3}$; This problem is equivalent to 8b, so you can use the same diagram.

9. F

10. C

11. a. $\frac{7}{9} \div \frac{1}{3} = 2\frac{1}{3}$ lattes, which means 2 full lattes and $\frac{1}{3}$ of another

b. $\frac{5}{6} \div \frac{2}{6} = 2\frac{1}{2}$ lattes, which means 2 full lattes and $\frac{1}{2}$ of another

c. $3\frac{2}{3} \div \frac{1}{3} = 11$ lattes

12. Possible answer: Josh is cooking for his nephews and wants to make as many recipes of chili as he can from the $1\frac{3}{4}$ cup of dried beans that he has on hand. Each recipe takes $\frac{1}{2}$ cup of dried beans. How many recipes can he make? Here you have to find $1\frac{3}{4} \div \frac{1}{2}$, or how many halves are in $1\frac{3}{4}$. There are 3 full batches and half of another, or $3\frac{1}{2}$ batches.

13. a. $\frac{5}{6} \div \frac{1}{3} = 2\frac{1}{2}$

b. $\frac{2}{3} \div \frac{1}{9} = 6$

c. $1\frac{1}{2} \div \frac{3}{8} = 4$

14. a. greater than 1; $\frac{7}{9}$ is made with many $\frac{1}{9}$ parts

b. greater than 1; if you rename $\frac{2}{3}$ as $\frac{6}{9}$, there are many $\frac{1}{9}$'s in $\frac{6}{9}$.

c. less than 1; 18ths are smaller than 9ths so $\frac{1}{9}$ will not fit or go into $\frac{1}{18}$ a whole time.

d. greater than 1; since 9ths are smaller than 1, more than 1 ninth will fit into 1 whole.

15. $10 \div \frac{2}{3} = 15$ **16.** $5 \div \frac{3}{4} = 6\frac{2}{3}$

17. $\frac{6}{7} \div 4 = \frac{3}{14}$ **18.** $\frac{3}{10} \div 2 = \frac{3}{20}$

19. $\frac{2}{5} \div \frac{1}{3} = 1\frac{1}{5}$ **20.** $2\frac{1}{2} \div 1\frac{1}{3} = 1\frac{7}{8}$

21. Exercise 15: I have a 10-ft roll of paper to make signs. If each sign takes $\frac{2}{3}$ ft of paper, how many signs can I make?
Exercise 17: I bought $\frac{6}{7}$ pound of jellybeans. If I wanted to share them with three other people, how much of a pound will each of us get?

22. $\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$, $\frac{5}{7} \times \frac{2}{3} = \frac{10}{21}$; $\frac{10}{21} \div \frac{2}{3} = \frac{5}{7}$, and $\frac{10}{21} \div \frac{5}{7} = \frac{2}{3}$

23. $\frac{3}{4} \div 1\frac{1}{2} = \frac{1}{2}$, $\frac{3}{4} \div \frac{1}{2} = 1\frac{1}{2}$, $1\frac{1}{2} \times \frac{1}{2} = \frac{3}{4}$; and $\frac{1}{2} \times 1\frac{1}{2} = \frac{3}{4}$

Connections

24. $2\frac{2}{5} - 1\frac{1}{2} = \frac{9}{10}$ km

25. $3 - 1\frac{3}{4} = 1\frac{1}{4}$ hours

26. $\frac{11}{10}$ or $1\frac{1}{10}$ (equivalent fractions will vary)

27. $\frac{41}{24}$ or $1\frac{17}{24}$ (equivalent fractions will vary)

28. 2 or $\frac{6}{3}$ (equivalent fractions will vary)

29. $4\frac{7}{12}$ (equivalent fractions will vary)

30. a. Possible answers: $\frac{2}{3}$ and $\frac{8}{12}$

b. Possible answers: $\frac{5}{6}$ and $\frac{20}{24}$

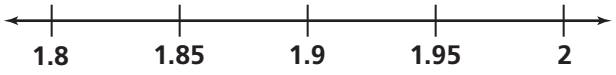
c. Possible answers: $\frac{4}{3}$ and $\frac{24}{18}$

d. Possible answers: $\frac{4}{3}$ and $\frac{16}{12}$

31. $\frac{2}{21}$ **32.** $\frac{21}{32}$

33. $\frac{3}{6}$ or $\frac{1}{2}$ **34.** $\frac{154}{12}$ or $12\frac{10}{12}$ or $12\frac{5}{6}$

35. a.



b.

c.

d.

e. To find the difference between two consecutive marks, take the difference between the two end points and divide by 4 because there are four equal divisions between the two endpoints. Then add that amount to the left endpoint to find the value for the first mark. Add that same value to that answer, and then add that amount once more to the next answer.

36. The numbers in each pair are reciprocals of each other.

a. Possible answer: $\frac{1}{2}$

b. Possible answer: 2

c. Possible answer: $\frac{1}{3}$

d. Possible answer: 3

e. Possible answer: $\frac{3}{2}$

f. Possible answer: $\frac{4}{3}$

g. Possible answer: $\frac{2}{5}$

h. Possible answer: $\frac{4}{5}$

i. Possible answer: $\frac{12}{7}$ or $1\frac{5}{7}$

37. The numbers in each pair are reciprocals of each other.

a. $\frac{1}{3}$ and 3

b. $\frac{1}{4}$ and 4

c. $\frac{1}{2}$ and 2

38. a. 3; $37\frac{1}{2}$% of the pizza is $\frac{3}{8}$ of the 8 slices or 3 slices.

b. 1; $\frac{3}{24} = \frac{1}{8}$. The pizza has 8 slices and $\frac{1}{8}$ of 8 slices is 1 slice.

c. $\frac{1}{2}$; 4 of the 8 pieces have other two toppings. 4 out of 8, or $\frac{1}{2}$ of the pizza, have onions and green peppers.