

## Applications

- 1; Possible explanation:  $\frac{9}{9}$  is 1, so  $\frac{10}{9}$  is more than 1.
- $\frac{1}{2}$ ; Possible explanation: Since  $\frac{8}{16} = \frac{1}{2}$ ,  $\frac{9}{16}$  is close to  $\frac{1}{2}$ .
- 1; Possible explanation:  $\frac{5}{6}$  is only  $\frac{1}{6}$  less than 1 whole.
- $\frac{1}{2}$ ; Possible explanation:  $\frac{1}{2}$  of 100 is 50, so  $\frac{48}{100}$  is closer to  $\frac{1}{2}$ .
- $\frac{1}{2}$ ; Possible explanation:  $\frac{1}{2}$  is 0.50 and  $\frac{3}{4}$  is 0.75, so 0.67 is close to  $\frac{1}{2}$ .
- 0; Possible explanation: 0.0009999 is a very small amount. It does not have any tenths in it, and  $\frac{1}{2}$  is equivalent to 5 tenths.
- 1; Possible explanation:  $\frac{7}{8}$  is a little less than 1 and  $\frac{4}{9}$  is a little less than  $\frac{1}{2}$ . Together, a little less than 1 and a little less than  $\frac{1}{2}$  is a little less than  $1\frac{1}{2}$  or closer to 1 than to 2.
- 2; Possible explanation:  $1\frac{3}{4}$  is closest to 2, and  $\frac{1}{8}$  is a small number that will make the sum closer to, but not greater than, 2.
- 3; Possible explanation:  $1\frac{1}{3}$  is a little more than 1.3. 1.3 and 1.3 is 2.6, which is greater than  $2\frac{1}{2}$ , and closest to 3.
- 0; Possible explanation: It would take two  $\frac{1}{4}$ 's to equal exactly  $\frac{1}{2}$ . Since  $\frac{1}{8}$  is less than  $\frac{1}{4}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$  is less than  $\frac{1}{2}$  and closer to 0.
- 2; three tenths and eight tenths have a sum greater than 1, so the total sum here is greater than 2.
- 2;  $1\frac{4}{10}$  is equivalent to 1.4 which, when added to 0.375, is 1.775, which is close to 2.
- 0.5; Possible explanation:  $\frac{3}{5}$  is a bit more than half, and  $\frac{1}{10}$  is a small fraction, not big enough to push  $\frac{3}{5}$  close to 1.
- 0.5; Possible explanation:  $\frac{1}{4}$  is exactly in the middle of 0 and  $\frac{1}{2}$ .  $\frac{1}{10}$  is a small fraction so the sum is closer to  $\frac{1}{2}$ , but not greater than  $\frac{1}{2}$ .
- 0; Possible explanation:  $\frac{1}{4} = \frac{2}{8}$ . Also,  $\frac{1}{4}$  is exactly halfway between 0 and  $\frac{1}{2}$ .  $\frac{1}{9} < \frac{1}{8}$ , so  $\frac{1}{9} + \frac{1}{8} < \frac{1}{4}$ . Therefore the sum is closer to 0 than to  $\frac{1}{2}$ .
- a. This is incorrect.  $\frac{1}{8} < \frac{1}{4}$ , so the sum here is less than  $\frac{3}{4}$ .  
b. Correct. Each fraction is equal to  $\frac{1}{2}$ , so the sum is 1.  
c. Correct.  $\frac{5}{6} > \frac{3}{4}$ , so the sum of  $\frac{5}{12}$  and  $\frac{5}{6}$  is also greater.  
d. Correct.  $\frac{5}{10} = \frac{1}{2}$  and  $\frac{3}{8} > \frac{1}{4}$ , so the sum is greater than  $\frac{3}{4}$ .
- Possible answer:  $\frac{1}{4}$  and  $\frac{1}{7}$
- Possible answer:  $\frac{3}{8}$  and  $\frac{4}{9}$
- Possible answer:  $\frac{5}{8}$  and  $\frac{1}{2}$
- Possible answer:  $\frac{5}{8}$  and  $\frac{7}{8}$
- a. The greatest possible sum is  $1.05 + \frac{9}{10}$ .  
b. The least possible sum is  $\frac{1}{4} + \frac{3}{5}$ .
- a. No; In the price list, the whole numbers add up to 9:  $2 + 1 + 1 + 1 + 3 + 1 = 9$ . The cheese is \$1.95, which brings the total to \$9.95. There's clearly enough in the cost of other items to put the total over \$10. (The exact cost of the groceries is \$12.42.)  
b. Possible answers: Milk, cheese, avocado (\$4.92); eggs, cheese, honey, bread (\$4.91)  
c. cereal, honey, and avocado (\$4.94)
- $\frac{5}{8}$  is closest to  $\frac{1}{2}$ . Possible explanation:  $\frac{4}{8} = \frac{1}{2}$ . The other  $\frac{1}{8}$  makes  $\frac{5}{8}$  just a little more than  $\frac{1}{2}$ , but not close to  $\frac{8}{8}$ , or 1 whole.

24. Soo has enough molding.  $\frac{7}{8}$  is  $\frac{1}{8}$  less than 1 whole and  $\frac{8}{7}$  is  $\frac{1}{7}$  more than 1 whole or  $1\frac{1}{7}$ . Since  $\frac{1}{7} > \frac{1}{8}$ , when the  $\frac{1}{7}$  is added to the  $\frac{7}{8}$  it will be greater than 1 yard, and the total will be greater than 2 yards.

25. He had about 8 quarts.

26. No; If you add  $\frac{3}{4}$  to  $1\frac{3}{4}$ , you will get  $2\frac{1}{2}$ . But  $\frac{5}{8}$  is a little less than  $\frac{3}{4}$ , so there is not enough.

27. a. Marigolds:  $\frac{3}{20}$ ; Lantana:  $\frac{1}{20}$ ;  
Impatiens:  $\frac{3}{10}$ ; Petunias:  $\frac{1}{10}$ ; Lilies:  $\frac{1}{5}$ ;  
Begonias:  $\frac{1}{20}$ ; Tulips:  $\frac{1}{20}$ ; Daisies:  $\frac{1}{20}$ ;  
Irises:  $\frac{1}{20}$

b.  $\frac{4}{20} - \frac{1}{20} = \frac{3}{20}$

c.  $\frac{4}{20} + \frac{1}{20} + \frac{1}{20} = \frac{6}{20}$ , or  $\frac{3}{10}$

d. Incorrect. Possible explanation: The number sentence for the situation is  $\frac{3}{20} - \frac{1}{20} = \frac{1}{10} + \frac{1}{20}$ . If you work out the subtraction problem on the left of the equal sign and the addition problem on the right, the answers are not the same.

e. Possible combinations that total  $\frac{3}{10}$ , the fraction planted with impatiens:

Marigolds + Petunias + Lantana:

$$\frac{3}{20} + \frac{1}{10} + \frac{1}{20} = \frac{3}{20} + \frac{2}{20} + \frac{1}{20} = \frac{6}{20} = \frac{3}{10}$$

Lilies + Petunias:  $\frac{4}{20} + \frac{2}{20} = \frac{6}{20}$ , or  $\frac{3}{10}$

Marigolds + Begonias + Tulips +

Daisies:  $\frac{3}{20} + \frac{1}{20} + \frac{1}{20} + \frac{1}{20} = \frac{6}{20}$ , or  $\frac{3}{10}$

28. a.  $\frac{1}{8} + \frac{1}{16} = \frac{3}{16}$  of the page is used for ads.

b.  $1 - \frac{3}{16} = \frac{13}{16}$  of the page remains.

29.  $\frac{3}{4}$  (three  $\frac{1}{4}$ -page ads, or  $3 \times \frac{1}{4}$ )  
plus  $\frac{4}{8}$  (four  $\frac{1}{8}$ -page ads, or  $4 \times \frac{1}{8}$ )  
plus  $\frac{10}{16}$  (ten  $\frac{1}{16}$ -page ads, or  $10 \times \frac{1}{16}$ )  
=  $1\frac{7}{8}$  pages.

30.  $2\frac{3}{4} - 1\frac{5}{8} = 1\frac{5}{8}$  pages

31.  $\frac{1}{9} + \frac{1}{18} = \frac{3}{18} = \frac{1}{6}$  of the lasagna is eaten, leaving  $\frac{5}{6}$  of the lasagna uneaten.

32.  $\frac{3}{4} + \frac{1}{8} = \frac{6}{8} + \frac{1}{8} = \frac{7}{8}$  of a small bag of chips

33.  $2\frac{11}{15}$

34.  $7\frac{3}{8}$

35.  $8\frac{5}{6}$

36.  $6\frac{2}{12}$  or  $6\frac{1}{6}$

37.  $\frac{3}{4} + \frac{4}{5}$  is greater:  $\frac{2}{3} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \frac{9}{6} =$

$$1\frac{1}{2} = 1\frac{10}{20}; \frac{3}{4} + \frac{4}{5} = \frac{15}{20} + \frac{16}{20} = 1\frac{11}{20}$$

38.  $\frac{7}{6} - \frac{2}{3}$  is greater:  $\frac{7}{6} - \frac{2}{3} = \frac{7}{6} - \frac{4}{6} = \frac{3}{6} =$

$$\frac{1}{2} = \frac{5}{10}; \frac{3}{5} - \frac{5}{10} = \frac{6}{10} - \frac{5}{10} = \frac{1}{10}$$

39.  $2\frac{5}{6} + 1\frac{1}{3} = 4\frac{1}{6}$

40.  $15\frac{5}{8} + 10\frac{5}{6} = 26\frac{11}{4}$

41.  $4\frac{4}{9} + 2\frac{1}{5} = 6\frac{29}{45}$

42.  $6\frac{1}{4} - 2\frac{5}{6} = 3\frac{5}{12}$

43.  $3\frac{1}{2} - 1\frac{4}{5} = 1\frac{7}{10}$

44.  $8\frac{2}{3} - 6\frac{5}{7} = 1\frac{20}{21}$

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

46.  $\frac{3}{6}$  or  $\frac{1}{2}$

47.  $\frac{3}{8}$

48.  $\frac{3}{10}$

49.  $\frac{3}{12}$

50.  $\frac{3}{14}$

In all of the problems, you add unit fraction where one fraction is half the size of the other. The fraction in each part with the lesser denominator is twice the value of the unit fraction with the greater denominator. You can think of the unit fraction with the lesser denominator as two unit fractions with the greater denominator. This gives a sum with a 3 in the numerator over the greater denominator.

51. No. If  $\frac{14}{16}$  of all the pizza were eaten, this would be less than one whole pizza. If there are eight sections in each pizza, then people are eating eighths. And all together they ate  $\frac{14}{8}$  or  $1\frac{6}{8}$  pizzas.

