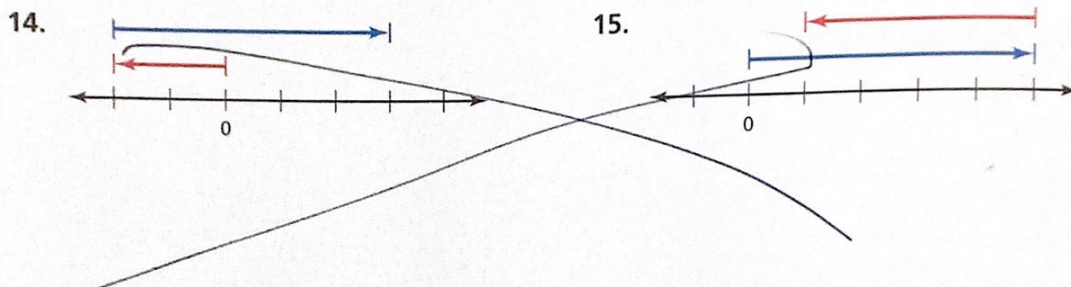


Concepts, Skills, & Problem Solving

USING TOOLS Choose a unit fraction to represent the space between the tick marks on the number line. Write the addition expression being modeled. Then find the sum. (See Exploration)



ADDING RATIONAL NUMBERS Find the sum. Write fractions in simplest form.
(See Examples 1 and 2.)

16. $5 + (-9)$

-4

▶ 17. $-8 + 12$

4

18. $-15 + (-10)$

-25

19. $-4.2 + 3.3$

-0.9

20. $12.48 + (-10.636)$

1.844

▶ 21. $\frac{11}{12} + \left(-\frac{7}{12}\right)$

$\frac{1}{3}$

22. $-20.25 + 15.711$

-4.539

23. $-1\frac{1}{5} + \left(-\frac{3}{5}\right)$

$-1\frac{4}{5}$

24. $-32.306 + (-24.884)$

-57.19

25. $-\frac{9}{14} + \frac{2}{7}$

$-\frac{5}{14}$

26. $-2\frac{1}{6} + \left(-\frac{2}{3}\right)$

$-2\frac{5}{6}$

27. $\frac{15}{4} + \left(-4\frac{1}{3}\right)$

$-\frac{7}{12}$

USING PROPERTIES Evaluate the expression. Write fractions in simplest form. (See Example 3.)

33. $17 + 22 + (-7)$

32

34. $30 + (-20 + 13)$

23

▶ 35. $4.5 + (-6.21) + (-4.5)$

-6.21

36. $8\frac{1}{2} + [4\frac{1}{10} + (-8\frac{1}{2})]$

$8\frac{1}{2} + -4\frac{2}{5}$

$4\frac{1}{10}$

37. $\frac{1}{3} + (\frac{2}{3} + \frac{5}{8})$

$\frac{1}{3} + 1\frac{1}{24}$

$1\frac{5}{8}$

38. $[5.6 + (-7.2)] + (-2.6)$

$-1.6 + -2.6$

-4.2

ADDING RATIONAL NUMBERS Find the sum. Explain each step.

39. $6 + 4\frac{3}{4} + (-2\frac{1}{2})$

$8\frac{1}{4}$

40. $-4.3 + \frac{4}{5} + 12$

$8\frac{1}{2}$

41. $5\frac{1}{3} + 7.5 + (-3\frac{1}{6})$

$9\frac{2}{3}$

42. **NUMBER SENSE** When is the sum of two negative mixed numbers an integer?

$4\frac{1}{2} + 4\frac{1}{2} = 9$

When the fractions add up to a whole number (integer)

43. **WRITING** You are adding two rational numbers with different signs. How can you tell if the sum will be *positive*, *negative*, or *zero*?

different signs → take the sign of the larger number

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MTR

44. **MODELING REAL LIFE** The table at the right shows the water level (in inches) of a reservoir for three months compared to the yearly average. Is the water level for the three-month period greater than or less than the yearly average? Explain. (See Example 4.)

June	July	August
$-2\frac{1}{8}$	$1\frac{1}{4}$	$-\frac{7}{8}$

Where is the yearly average?

45. **PROBLEM SOLVING** A carpenter purchases 6 wooden boards to use on home repairs. How much wood remains when the carpenter uses 2 boards to repair a door frame, 0.5 of a board to replace a step, and $\frac{1}{8}$ of a board to repair a cabinet?

$$6 - 2 - 0.5 - \frac{1}{8}$$

$3\frac{3}{8}$ boards

~~4.5~~



46. **PROBLEM SOLVING** A puma navigates the treetops, searching for a place to rest. The puma climbs from ground level up 8.7 feet, down 3.6 feet, up 12.2 feet, and down 4.5 feet and then finds a branch to rest on. What is the puma's elevation?

12.8 ft

47. **PROBLEM SOLVING** You have 100 gigabytes of storage available on your game console. The table shows various games you can download. Which games should you download if you want the greatest possible number of games on your game console? Explain.

Game	Storage Space (in gigabytes)
1	45.7
2	98
3	25.9
4	30
5	42.4

Game 3, 4, 5

Game 1 would allow me to download 2 games

Game 2 wouldn't allow any others

7
MTR

48. **MODELING REAL LIFE** A scientist monitors the temperature of a lake for 5 days. The table shows the change in water temperature each day (in degrees Fahrenheit). What is the water temperature of the lake after day 5 when the lake was 80°F at the beginning of day 1?

Day 1	Day 2	Day 3	Day 4	Day 5
-0.5	+2.25	+0.2	-3.75	+0.1

78.3°F

SUBTRACTING RATIONAL NUMBERS Find the difference. Write fractions in simplest form. (See Examples 1 and 2.)

10. $9 - 13$

-4

11. $-12 - 14$

-26

12. $-17 - (-5)$

-12

▶ 13. $\frac{5}{8} - (-\frac{7}{8})$

$1\frac{1}{2}$

14. $-1\frac{1}{3} - 1\frac{2}{3}$

-3

15. $-1 - 2.5$

-3.5

16. $\frac{4}{5} - (-\frac{3}{10})$

$1\frac{1}{10}$

▶ 17. $5.5 - 8.1$

-2.6

18. $-5 - \frac{5}{3}$

$-6\frac{2}{3}$

19. $-8\frac{3}{8} - 10\frac{1}{6}$

$-18\frac{13}{24}$

20. $-4.62 - 3.51$

-8.13

21. $-\frac{1}{2} - (-\frac{5}{9})$

$\frac{1}{18}$

22. $-7.34 - (-5.51)$

-1.83

23. $6.673 - (-8.29)$

14.963

24. $12\frac{2}{5} - 17\frac{1}{3}$

$-4\frac{14}{15}$



25. **YOU BE THE TEACHER** Your friend finds the difference. Is your friend correct? Explain your reasoning.

no

$\frac{3}{2} - \frac{9}{2} = (-3)$

$-\frac{6}{2} = -3$

$\frac{3}{2} - \frac{9}{2} = \left| \frac{3}{2} \right| + \left| \frac{9}{2} \right| = \frac{12}{2} = 6$

USING PROPERTIES Tell how the Commutative and Associative Properties of Addition can help you evaluate the expression. Then evaluate the expression. (See Example 3.)

▶ 31. $\frac{3}{4} + \frac{2}{3} - \frac{3}{4}$

$\frac{2}{3}$

32. $\frac{2}{5} - \frac{7}{10} - \left(-\frac{3}{5}\right)$

$\frac{3}{10}$

33. $8.5 + 3.4 - 6.5 - (-1.6)$

7

34. $-1\frac{3}{4} - \left(-8\frac{1}{3}\right) - \left(-4\frac{1}{4}\right)$

$10\frac{5}{6}$

35. $2.1 + (5.8 - 4.1)$

$2.1 + 1.7$

3.8

36. $2\frac{3}{8} - 4\frac{1}{2} + 3\frac{1}{8} - \left(-\frac{1}{2}\right)$

$1\frac{1}{2}$

FINDING DISTANCE ON A NUMBER LINE Find the distance between the two numbers on a number line. (See Example 4.)

37. 2.7 and 5.9

3.2

38. $-\frac{7}{9}$ and $-\frac{2}{9}$

$\frac{5}{9}$

▶ 39. -2.2 and 8.4

10.6

40. $\frac{3}{4}$ and $\frac{1}{8}$

$\frac{5}{8}$

41. -1.85 and 7.36

9.21

42. -7 and $-3\frac{2}{3}$

$3\frac{1}{3}$

43. 2.491 and -3.065

5.556

44. $-2\frac{1}{2}$ and $-5\frac{3}{4}$

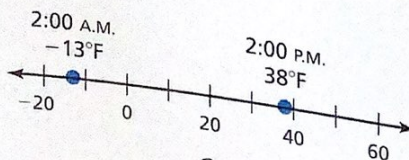
$3\frac{1}{4}$

45. $-1\frac{1}{3}$ and $12\frac{7}{12}$

$-13\frac{11}{12}$



46. **MODELING REAL LIFE** The number line shows the temperatures at 2:00 A.M. and 2:00 P.M. in the Gobi Desert. Find and interpret the distance between the points. (See Example 5.)



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