Applications

For Exercises 1–4, describe a sequence of five correct or incorrect answers that would produce each Math Fever score. Write a number sentence for each score.

1. Super Brains: 300

2. Rocket Scientists ⁻200

3. Know-It-Alls: ⁻250

4. Teacher's Pets: 0

5. **Multiple Choice** Which numbers are listed from least to greatest?

   A. 300, 0, ⁻200, ⁻250

   B. ⁻250, ⁻200, 0, 300

   C. 0, ⁻200, ⁻250, 300

   D. ⁻200, ⁻250, 300, 0

For Exercises 6–8, find each Math Fever team's score. Write a number sentence for each team. Assume that each team starts with 0 points.

6. **Protons**		7. **Neutrons**		8. **Electrons**	
Point Value	Answer	Point Value	Answer	Point Value	Answer
250	Correct	200	Incorrect	50	Incorrect
100	Correct	50	Correct	200	Incorrect
200	Correct	250	Correct	100	Correct
150	Incorrect	150	Incorrect	200	Correct
200	Incorrect	50	Incorrect	150	Incorrect

For each set of rational numbers in Exercises 9 and 10, draw a number line and locate the points. Remember to choose an appropriate scale.

9. $-\frac{2}{8}, \frac{1}{4}$ ⁻1.5, $1\frac{3}{4}$

10. ⁻1.25, $-\frac{1}{3}$, 1.5, $-\frac{1}{6}$

11. Order the numbers from least to greatest.

$$23.6 \quad ^-45.2 \quad 50 \quad ^-0.5 \quad 0.3 \quad \frac{3}{5} \quad -\frac{4}{5}$$

**Copy each pair of numbers in Exercises 12–19. Then insert < , >, or =
to make each a true statement.**

12. 3 ▮ 0

13. ⁻23.4 ▮ 23.4

14. 46 ▮ ⁻79

15. ⁻75 ▮ ⁻90

16. ⁻300 ▮ 100

17. ⁻1,000 ▮ ⁻999

18. ⁻1.73 ▮ ⁻1.730

19. ⁻4.3 ▮ ⁻4.03

20. a. Estimate values for points *A–E*.
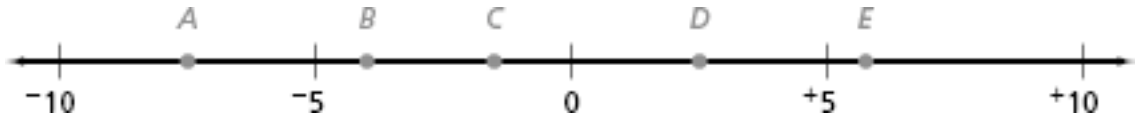
b. On a copy of the number line, graph the following numbers.

$$^-9 \qquad 10.5 \qquad \frac{1}{2} \qquad -\frac{5}{2}$$

c. Describe the location of a number and its opposite on the number line.

21. For each pair of numbers, identify which number is farther from ⁺1.
Explain your reasoning.

a. ⁻7 or ⁺3

b. ⁻10 or ⁺7

22. Identify the temperature that is halfway between each pair of
temperatures.

a. ⁻23°F and ⁺23°F

b. ⁻20°F and ⁺10°F

c. ⁺20°F and ⁻10°F

Did You Know?

The record high and low temperatures in the United States are 134°F in Death
Valley, California and ⁻80°F in Prospect Creek in the Endicott Mountains of
Alaska. Imagine going from 134°F to ⁻80°F in an instant!

For Exercises 23–30, graph each statement on a number line.

23. x is less than 7.

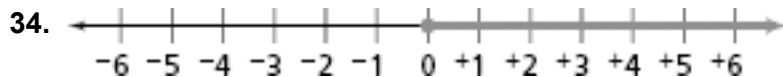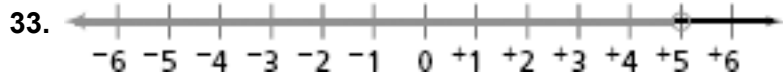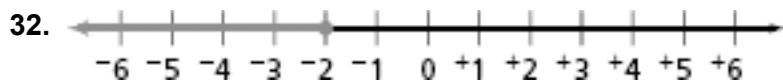**24.** x is greater than or equal to $^-7$.

25. $x < ^-2$

26. $x \geq ^-1$

27. $x \leq 8$

28. $x < 5$

29. $^-3 < x < 5$

30. $x > ^-6$

For Exercises 31–34, write an inequality for each set of numbers on the number line.

31.

```
 ̄6  ̄5  ̄4  ̄3  ̄2  ̄1  0 +1 +2 +3 +4 +5 +6
```

32.

```
 ̄6  ̄5  ̄4  ̄3  ̄2  ̄1  0 +1 +2 +3 +4 +5 +6
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33.

```
 ̄6  ̄5  ̄4  ̄3  ̄2  ̄1  0 +1 +2 +3 +4 +5 +6
```

34.

```
 ̄6  ̄5  ̄4  ̄3  ̄2  ̄1  0 +1 +2 +3 +4 +5 +6
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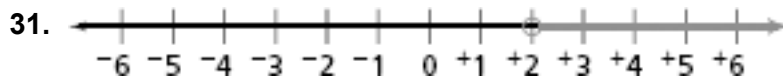
35. The school cafeteria can hold at most 150 people.

   a. Write a number sentence to represent the number of people that can be in the cafeteria at any time during the day.

   b. Graph your answer to part (a) on a number line.

For Exercises 36–45, follow the steps using the number line. What is the final position?


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 ̄11 ̄10  ̄9  ̄8  ̄7  ̄6  ̄5  ̄4  ̄3  ̄2  ̄1  0  1  2  3  4  5  6  7  8  9  10 11
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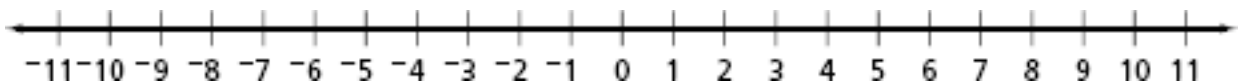
36. Start at 8. Add $^-7$.

37. Start at $^-8$. Add 10.

38. Start at $^-3$. Add $^-5$.

39. Start at 7. Add $^-7$.

40. Start at $^-2$. Add 12.

41. Start at 3. Subtract 5.

42. Start at $^-2$. Subtract 2.

**43.** Start at 4. Subtract 7.

44. Start at 0. Subtract 5.

45. Start at $^-8$. Subtract 3.

46. a. What are the opposites of 3, 7.5, and $^-2\frac{2}{3}$?

b. For each number in part (a), find the sum of that number and its opposite.

47. The greatest recorded one-day temperature change occurred in Browning, Montana (bordering Glacier National Park), from January 23–24, 1916. The temperature fell from 44°F to $^-56$°F in less than 24 hours.

a. What was the temperature change that day?

b. Write a number sentence to represent the change.

c. Show the temperature change on a number line.

48. Find the value for each labeled point on the number line. Then use the values to calculate each change.
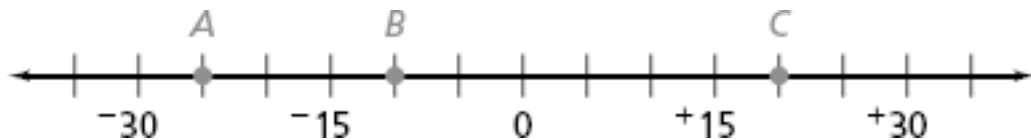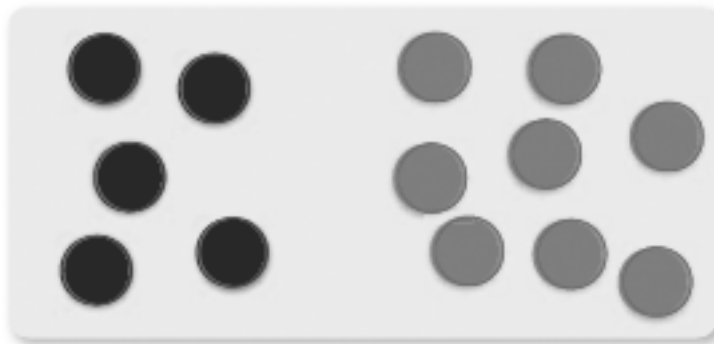

a. *A* to *B*	**b.** *A* to *C*	**c.** *B* to *C*
d. *C* to *A*	**e.** *B* to *A*	**f.** *C* to *B*

For Exercises 49–52, find the missing part for each chip problem. Write a number sentence for each problem.

	Start With	Rule	End With	Number Sentence
49.	● ● ●	Add 5 ●	■	■
50.	● ● ●	Subtract 3 ●	■	■
51.	● ● ● ● ●	■	● ●	■
52.	■	Subtract 3 ●	● ● ● ●	■

53. Write a story problem for this situation. Find the value represented by the chips on the board.

For Exercises 54 and 55, use the chip board from Exercise 53.

54. What is the new overall value of the board when you

    a. remove 3 red chips?

    b. then add 3 black chips?

    c. then add 200 black chips and 195 red chips?

55. Describe three different ways to change the numbers of black and red chips on the original board, but leave the value of the board unchanged.

Connections

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56. In a football game, one team makes seven plays in the first quarter. The results of those plays are (in order): gain of 7 yards, gain of 2 yards, loss of 5 yards, loss of 12 yards, gain of 16 yards, gain of 8 yards, loss of 8 yards.

    a. What is the overall gain (or loss) from all seven plays?

    b. What is the average gain (or loss) per play?

For Exercises 57 and 58, find the total number of strokes over or under par for each golf player. Write number sentences with positive and negative integers to show each result.

	Player	Round 1	Round 2	Round 3	Round 4
57.	Elijah Sparks	4 over par	6 under par	3 under par	1 over par
58.	Keiko Aida	2 under par	1 under par	5 over par	5 under par

For Exercises 59–64, draw a number line and label it with an appropriate scale. Graph and name the two numbers described on the number line.

59. two fractions between 0 and 1   **60.** two fractions between 2 and 3

61. two fractions between $^-$1 and 0   **62.** two decimals between $^-$3 and $^-$2

63. two decimals between 4 and 5   **64.** two decimals between $^-$4 and $^-$3

There is always a rational number between two other rational numbers. For Exercises 65–67, graph the two numbers on a number line. Then graph and label a point between the two numbers.

65. 1.4 and 1.5   **66.** $^-$1.42 and $^-$1.4   **67.** $^-5\frac{1}{2}$ and $^-5\frac{1}{4}$

For Exercises 68 and 69, copy the number line below.

68. Label the first tick mark 28.36 and the last tick mark 28.37. Label the appropriate tick mark for 28.369. Then label the remaining tick marks.

69. Label the first tick mark $^-$7.7 and the last tick mark $^-$7.6. Label the appropriate tick mark for $^-$7.65. Then label the remaining tick marks.

For Exercises 70 and 71, label the tick marks on each number line.
Explain why you labeled them that way.

70.

5.37482

5.30   5.40

71.

5.37482

5.370   5.380
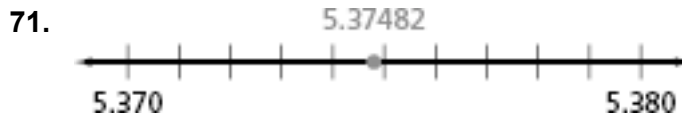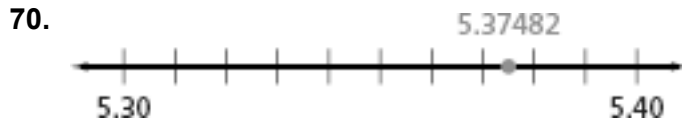
For Exercises 72–75, order the numbers from least to greatest.

72. $\dfrac{2}{5}, \dfrac{3}{10}, \dfrac{5}{9}, \dfrac{9}{25}$

73. 20.33, 2.505, 23.30, 23

74. 1.52, $1\dfrac{4}{7}$, 2, $\dfrac{9}{6}$

75. 3, $\dfrac{19}{6}$, $2\dfrac{8}{9}$, 2.95

For Exercises 76 and 77, use the following. The highest point on earth
is the top of Mount Everest. It is 29,035 feet above sea level. The lowest
exposed land is the shore of the Dead Sea. It is 1,310 feet below sea level.

76. Multiple Choice What is the change in elevation from the top of
Everest to the shore of the Dead Sea?

F . ¯30,345 feet   **G.** ¯27,725 feet

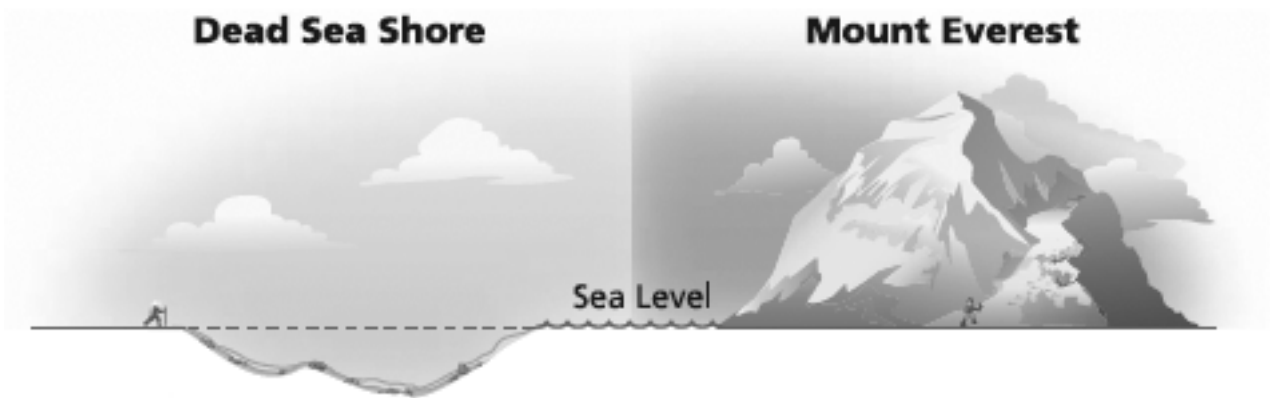**H.** 27,725 feet   **J.** 30,345 feet

77. Multiple Choice What is the change in elevation from the shore of
the Dead Sea to the top of Everest?

A. ¯30,345 feet   **B.** ¯27,725 feet

C. 27,725 feet   **D.** 30,345 feet

Dead Sea Shore   **Mount Everest**

Sea Level

Extensions

78. At the start of December, Kenji had a balance of $595.50 in his checking account. The following is a list of transactions he made during the month.

Date	Transaction	Balance
December 1		$595.50
December 5	Writes a check for $19.95	
December 12	Writes a check for $280.88	
December 15	Deposits $257.00	
December 17	Writes a check for $58.12	
December 21	Withdraws $50.00	
December 24	Writes checks for $17.50, $41.37, and $65.15	
December 26	Deposits $100.00	
December 31	Withdraws $50.00	

a. Copy and complete the table.

b. What was Kenji's balance at the end of December?

c. When was his balance the greatest? When was his balance the least?

For Exercises 79–84, find all the values of x that satisfy the statement. Then sketch the solution on a number line.

79. $x + 2$ is negative. **80.** $x - 5$ is greater than 0. **81.** $x + 3 < 1$

82. $x + 3 \geq 2$ **83.** $3 - x < 0$ **84.** $6 \leq x - 4$

For Exercises 85–87, find the missing temperature in each situation.

85. On Monday, the high temperature was 20°C. The low temperature was ⁻15°C. What temperature is halfway between the high and the low?

86. On Tuesday, the low temperature was ⁻8°C. The temperature halfway between the high and the low is 5°C. What was the high temperature?

87. On Wednesday, the high temperature was ⁻10°C. The low temperature was ⁻15°C. What temperature is halfway between the high and the low?

Find values for A and B that make each mathematical sentence true.

88. $^+A + ^-B = ^-1$ **89.** $^-A + ^+B = 0$ **90.** $^-A - ^-B = ^-2$