1. What is the difference between the solution set of an inequality and the solution set of an equation?
2. What's the biggest difference between solving linear inequalities and solving linear equations?
3. Write a situation in our world where an inequality would be useful.
4. What does it mean to graph the solution set of an inequality?

Computational Exercises

For Exercises 5–14, show the solutions using a graph.

5. $x \geq 3$
6. $x < -2$
7. $y < -40$
8. $y \geq 0$
9. $x \leq -9$
10. $x \leq 120$
11. $-3 < t < 7$
12. $4 \leq t \leq 10$
13. $25 < x \leq 50$
14. $-300 \leq x < 0$

For Exercises 15–58, solve each inequality and graph the solution set on a number line.

15. $x + 6 < 11$
16. $x - 2 \leq 15$
17. $3y \geq 18$
18. $5y < 30$
19. $7 - x > 42$
20. $9 - x \leq 20$
21. $\frac{2}{3}x < 18$
22. $\frac{3}{4}x \geq 36$

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requires 20 volunteers, all of whom will get the same fee. How much can the researcher offer to each volunteer?

76. In Beth's Greek mythology course, quizzes are worth 25% of the grade, tests are worth 60% of the grade, and the final exam is worth 15% of the grade. If Beth has an 82% quiz average and a 76% test average, what grade will she need on the final exam to get a B in the course with at least an 80% overall average?

77. When renting a car for her trip, Janice has the option of paying $0.32 a mile plus putting $25 down (option A) or she can pay $0.40 a mile (option B). What is the least amount of miles Janice can drive to make option A the cheaper option?

78. A foster-care facility houses children that have been removed from high-risk homes temporarily while permanent housing is located. The county pays the facility a weekly fee of $730 for each child under the age of 7 they take in, and $500 for each child between 7 and 18. The facility currently has four children under the age of 7, which is the largest number they have accommodations for. What's the smallest number of children between 7 and 18 they would need to take in to reach a weekly payment of $4,100?

79. Alana's using a pay-as-you-go phone with a monthly access fee of $18.83, and a flat per-minute rate of $0.033. If she were willing to sign a contract with a national carrier, she'd get unlimited minutes for $50 per month total. What range of minutes used will make the pay-as-you-go plan cheaper?

80. Dave works at the mall part-time for $9 per hour and notices that 20% of his check is deducted for taxes. If he wants to take home at least $200 per week, how many hours does he have to work?

81. Shelly has saved $10,000 to put down on her first house. She wants to make a down payment of 8% of the purchase price of the house and she was told it would cost 5% of the purchase price for closing costs and legal fees. What is the maximum price of house she can afford?

82. Amy spends $300 a month on bills, $600 a month on food and gas, $350 for her car, and $125 for her car insurance. If she makes $2,250 a month but wants to put 10% of the remaining money into her savings account, what is the most she can spend on her monthly rent?

83. A furniture designer for IKEA is planning a new shelving unit with shelves that are one-third as wide as the height of the unit. There will be four horizontal shelves with two vertical risers. To stay within budget the unit should use no more than 22 feet of wood. What are possible ranges of height that fit all of those criteria? What range do you think is reasonable?

84. Hideo can select from two salary plans. Plan A will pay him $20 per hour plus a $100 weekly bonus and Plan B will pay him $25 per hour. How many hours should Hideo work so that he earns the most from Plan B?

85. On his first four tests, Alon got 65%, 72%, 85%, and 90%. He wants a B in the course, which would mean his overall average would have to be between 80% and 89%. What range of scores can Alon get on his last test so he can get a B in the course?

86. On Molly's new diet, she is supposed to eat a lunch that is between 300 and 500 calories. She selects a yogurt for 100 calories and a half a bagel for 135 calories. How many calories could a third item contain so she remains on her diet?

87. Adrian spends a third of his week sleeping, 10 hours a week in class, 25 hours a week studying, 5 hours a week traveling, and 20 hours a week socializing. He also works part time at the campus café. Altogether, Adrian spends between 136 and 146 hours a week for all of those activities. How many hours a week does Adrian work?

88. Hannah wants to invest a certain amount of money into various accounts. She wants to invest 20% into Fund A and 15% into Fund B and then take half of the remainder and put it into Fund C. The amount left is between $1,000 and $1,500. How much money did Hannah start with?

23. $-10t < 30$
24. $-25t \geq 100$
25. $2z + 8 \geq 32$
26. $5z - 6 < 39$
27. $-3x + 12 \leq 36$
28. $5 - 2x > 25$
29. $6(x - 12) \leq 54$
30. $-3(2x + 7) < -16$
31. $-5(3 - y) \leq 27$
32. $9(4y - 1) > 71$
33. $11 - \frac{7}{2}y \geq 3$
34. $18 < 4 - \frac{11}{4}t$

35. $3(x + 1) - 10 < 2x + 7$
36. $4(n - 8) - 2n < -22$
37. $9 - 5(n + 6) \geq 32$
38. $18 - 6(x + 2) < 41$
39. $6(2x + 3) \geq 5(2x - 15)$
40. $-2(\frac{13}{2} + 3x) \geq \frac{3}{4}x + 2$
41. $\frac{5}{3}y + 12 \leq 6 - 12(\frac{11}{6} + 2y)$
42. $3x + 6 < -8x + 7$
43. $5.4 - 3.1x \geq 8 + 5.9x$
44. $2z - 11.9 < 6.3z - 4.2$
45. $-3(1.5t + 4.1) + 3 \leq 2t - 4.7$
46. $9.8 - 7(6.5x + 4) > 3.2 - x$

47. $3 \leq x + 10 < 18$
48. $-5 < 11 + y \leq -1$
49. $-8 < 3y + 1 < 10$
50. $3 \leq 2x - 7 \leq 11$
51. $-5 < -4z \leq 20$
52. $3 \leq -2x < 4$
53. $0 < 5(3 - 2x) < 25$
54. $-30 \leq -2(2t + 4) \leq 44$
55. $-8 < \frac{11}{4}y - 10 \leq \frac{1}{2}$
56. $\frac{4}{3} \leq 5 + \frac{23}{9}z < 9$
57. $-8 \leq 3 - \frac{2}{5}(x - 10) \leq 4$
58. $9 < 4 - \frac{9}{4}(2y - 20) < 10$

Applications in Our World

The list shown here represents the average number of tornados per year for the given states. Let x represent the average number of tornados per year. For Exercises 59–64, write the name or names of the states that are described by the solution to the inequality.

State	Average number of tornados per year
Texas	168
Florida	79
Kansas	75
Colorado	58
West Virginia	30
Missouri	26
Pennsylvania	22
California	14
Maryland	11
Arizona	5
Delaware	2
Maine	1

Source: *USA TODAY*

59. $x \geq 58$
60. $x < 22$
61. $26 \leq x < 58$
62. $2 < x \leq 22$
63. $11 \leq x \leq 30$
64. $30 < x < 168$

Write each statement in Exercises 65–70 as an inequality. State what the variable you choose represents.

65. I spend at least 6 hours a week working out.
66. I spend no more than 2 hours a day on Facebook.
67. As long as tuition is under $6,500, I can stay in school next year.
68. If I make over $2,200 this summer I can study abroad next spring.

69. The lowest test score in a class was 46%, and the highest was 98%.
70. The shortest baseball game of the year was 111 minutes and the longest was 326 minutes.
71. Mary is in the market for a good used car and can afford to spend at most $8,000. The sales tax rate in her county is 7%, and title and license plate fees come to $120. When she starts talking price at the car lot, the salesperson says that the asking price for the car she wants is $7,800. How much does Mary have to get them to shave off the price for her to be able to afford the car?
72. Paula and Melinda are considering selling their house, which they paid $150,000 for, but they'll only do so if they make at least a 10% profit. They'll have to pay 7% of the selling price in commission to their real estate agent, as well as $1,000 in closing costs. A potential buyer has offered $163,000 for the home. How much will they need to raise that offer for Paula and Melinda to consider accepting it?
73. Bill has three test grades of 95, 84, and 85 so far. If the final examination, still to come, counts for two test scores, what is the lowest he can score on the final exam and still get an A for the course? He needs at least 450 points for an A.
74. In order to get a C for her sociology course, Betsy needs at least a 70% average. On exam 1 she scored 78% and on exam 2 she scored 68%. What is the lowest score she can get on the last exam?
75. A health care researcher needs to hire volunteers for a study testing a new experimental therapy for rheumatoid arthritis. She receives a grant from a local hospital that allows her to pay up to $3,500 to the volunteers, but 12% of what she pays will go to a marketing service that locates volunteers. The study