Honors Algebra 2 Name: _____

Chapter 1 Review Packet

The problems are numbered (*Chapter number*).(*Section number*).(*Problem number*). Refer to your text for help or to seek similar problems for extra practice. Unless stated otherwise, round dollar amounts to the nearest penny and all other answers to three decimal places. Include the units with your answer when applicable. Only use a calculator when you see the calculator symbol ▮.

1.2.1. Define the word linear.

Solve the equation.

1.2.2. $4 - 3(c - 5) = 2(c + 7)$

1.2.3. $5(x + 6) + 4(3 - 2x) = 11 + 4x$

1.2.4. $18 - [3x + 5 - (8 - 4x)] = 6(2 - x)$

1.2.5. $\frac{x+1}{4} = \frac{1}{6} + \frac{2-x}{3}$

a. Write the value(s) that made the denominator(s) zero. b. Solve the equation.

1.2.6. $\frac{2n+1}{5n} = 1 - \frac{7-2n}{3n}$

1.2.7. $\frac{5}{2x} - \frac{3}{4} = \frac{4}{x} + \frac{1}{2}$

1.2.8. $\frac{3}{n+4} - 7 = \frac{-4}{n+4}$

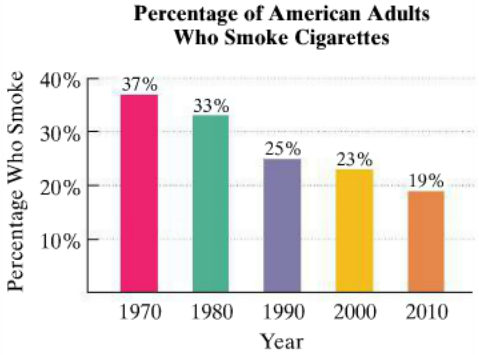
1.2.9. $\frac{8x}{x+1} = 4 - \frac{8}{x+1}$

1.2.10. $\frac{3}{x^2+5x} - \frac{1}{x} = \frac{4}{x+5}$

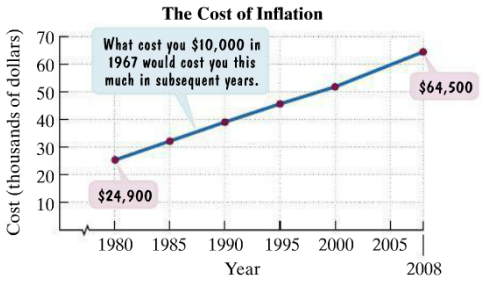
1.2.11. $\frac{7}{a-3} = \frac{2}{a^2+a-12} - \frac{3}{a+4}$

1.2.12. If $y_1 = \frac{2}{x+3}$, $y_2 = \frac{5}{x+4}$, and $y_3 = \frac{3}{x^2+7x+12}$, solve the equation $y_3 - y_1 = y_2$.

▮1.2.13. The bar graph shows the percentage of American adults who smoke cigarettes for selected years from 1970 through 2010. The model below describes the percentage of Americans who smoked cigarettes, p, x years after 1970. a. According to the model , what percentage of adults smoked cigarettes in the year 1987? b. Use the model to project the year when only 9% of American adults will smoke cigarettes. $p + \frac{x}{2} = 37$



▌1.2.14. The line graph shows the cost of inflation. What cost $10,000 in 1967 would cost the amount shown in the graph in subsequent years. Below is a mathematical model for the data shown by the graph. C represents the cost x years after 1980 of what cost $10,000 in 1967. a. Use the graph to estimate the cost in 1994, to the nearest thousand dollars, of what cost $10,000 in 1967. b. Use the model to determine the cost in 1994. How well does this describe your estimate? $C = 1{,}388x + 24{,}963$



Source: U.S. Bureau of Labor Statistics

Use your graphing calculator to graph each side of the equation separately under y_1 and y_2. Use your calculator to solve the equation.

▌1.2.15. $\frac{x+5}{4} - 2 = \frac{x-3}{6}$

▌1.2.16. $2^{3-x} = 0.6x + 1$

▌1.3.1. What is 73% of 49?

▌1.3.2. 62 is what percent of 81?

▌1.3.3. 38 is 21% of what number?

▌1.3.4. 195 decreased by 32% is what number?

▌1.3.5. 47 increased by 72% is what number?

▌1.3.6. After decreasing a number by 60%, its value is 18. What is the number?

▌1.3.7. Juan uses a 10% off total purchase coupon at his local supermarket. His checkout price before tax is $83.11. How much would he have paid without the coupon?

▌1.3.8. A college bookstore marks up the price it pays the publisher for a book by 20%. If the selling price of a book is $79, how much did the bookstore pay for the book?

▌1.3.9 A builder of tract homes reduced the price of a model by 15%. If the new price is $186,660, what was its original price?

▌1.3.10. After your meal at a local restaurant, you get your bill, and the total is $49.23. If you add an 18% tip, what will the total be?

▌1.3.11. Some shoes you want to buy are on sale 30% off, and they're currently selling for $45. What was their price before the sale?

▌1.3.12. Last week a gallon of milk sold for $2.85. This week it's selling for $3.10. By what percent did the price increase?

▌1.3.13. A winter coat you are considering buying was selling for $125, but now it is on sale for $99. By what percent was the price decreased?

Answer in a complete sentence.

1.3.14. How do you make a number 8% larger?

1.3.15. How do you make a number 14% smaller?

1.3.16. Percent means _____.

▌1.3.17. Over the course of his life, Mike sleeps for 25 years more than he spends eating. If he eats and sleeps for a total of 34 years, how many hours does he spend sleeping? Write an equation and solve it to answer the question.

▌1.3.18. Kira's car is worth $3,000 more than twice the value of Jennifer's car. Together the total value of their cars is $40,500. What is the value of each of their cars? Write an equation and solve it to answer the question.

▌1.3.19. The population of a town in 2003 was 11,250, and it increased by 684 people each year after that. If this trend continues, in which year will the town's population reach 20,826 people? Write an equation and solve it to answer the question.

▌1.3.20. A new boat is worth $41,700, and its worth is depreciating by $2,800 per year. a. Write a formula that models the boat's value, y, in dollars after x years. b. Use the model to determine after how many years the boat's value will be $16,500.

▌1.3.21. Taxi cab company A charges a flat fee of $5.50 and $1.45 per mile. Taxi cab company B charges a flat fee of $3.80 and $1.55 per mile. How far would a customer have to travel for the cost to be the same with both companies? Write an equation and solve it to answer the question.

▌1.3.22. The discount pass for a bridge costs $40. The toll for the bridge is normally $4.50, but with the discount the toll price is reduced to $2. How many times in a month would a person need to use the pass to pay for the cost of the pass? Write an equation and solve it to answer the question.

▌1.3.23. The population of Algebratown was 58,300 in 2006, and it was increasing by 430 people per year. The population of Geoville was 83,600 in 2006, and it was decreasing by 120 people per year. If this trend continues, in which year will their populations be equal? Write an equation and solve it to answer the question.

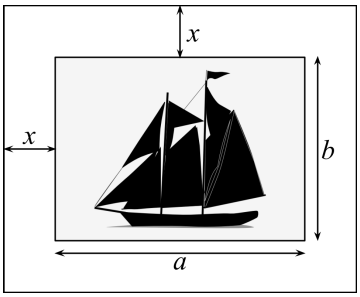
▌1.3.24. You invest $6,000 by putting some in account A and the rest in account B. The amount that you put in account A earned 6%, and the amount you put in account B earned 9%. You earned a total of $474. How much did you put in each account? Write an equation and solve it to answer the question.

▌1.3.25. You invest $11,000 by putting some in account A and the rest in account B. The amount that you put in account A earned 8%, and the amount you put in account B lost 5%. You earned a total of $334. How much did you put in each account? Write an equation and solve it to answer the question.

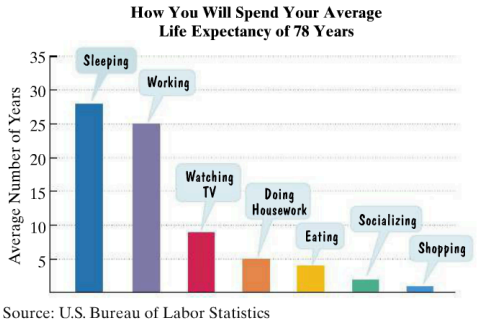
▌1.3.26. A rectangular plot of land is three times as long as it is wide. Its perimeter is 592 meters. What are the dimensions of the plot of land? Write an equation and solve it to answer the question.

▌1.3.27. Tom's kitchen is 3 feet longer than it is wide. The perimeter of the kitchen is 50 feet. What are the dimensions of the kitchen? Write an equation and solve it to answer the question.

▌1.3.28. A painting has dimensions of $a = 28$ cm by $b = 23$ cm. The painting has a frame around it that has a uniform width. If the perimeter of the frame is 138 centimeters, what is the width of the frame, x? Write an equation and solve it to answer the question.

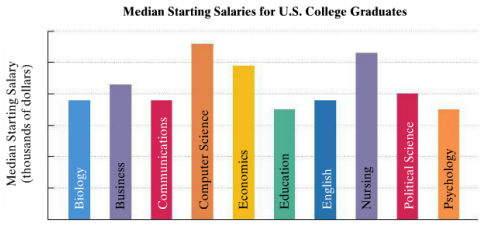


▌1.3.29. The bar graph shows the average number of years of your life you will devote to the activities listed. If you will spend a total of 13 years of your life watching TV and eating, and you watch TV for 4.6 years more than you spend eating, determine how many years you will engage in each of these activities.



Source: U.S. Bureau of Labor Statistics

▌1.3.30. The bar graph shows the ten most popular college majors with median, or middlemost, starting salaries for recent college graduates. The median starting salary of a computer science major exceeds that of a biology major by $17,000. The median salary of an economics major exceeds that of a biology major by $10,000. Combined, their median starting salaries are $142,800. Determine the median starting salaries of biology majors, computer science majors, and economics majors with bachelor's degrees.



▌1.3.31. You are choosing between two health clubs. Club A offers membership for a fee of $38 plus monthly fees of $25.50. Club B offers membership for a fee of $27 plus a monthly fee of $26. a. After how many months will the total cost at each health club be the same? b. What will be the total cost for each club after that many months?

▌1.3.32. You use a taxi cab to get a ride across town. The driver tells you he charges $3.50 plus $2.50 per mile. If the ride ends up costing you $32.50, how far did the driver take you?

1.4.1. Give the definition of a complex number.

1.4.2. The number i is an abbreviation for _____, and i^2 equals _____.

Write each expression using the imaginary unit, i.

1.4.3. $\sqrt{-49}$

1.4.4. $\sqrt{-11}$

Write each of the complex numbers in standard form, $a + bi$.

1.4.5. $\left(\sqrt{81} + \sqrt{-9}\right) + \left(\sqrt{-36} + \sqrt{25}\right)$

1.4.6. $\left(\sqrt{64} + \sqrt{-16}\right) - \left(\sqrt{9} - \sqrt{-4}\right)$

Simplify. Leave your answer in standard form, $a + bi$.

1.4.7. $7\sqrt{-25}$

1.4.8. $-4i \cdot 5i$

1.4.9. $(6i)^2$

1.4.10. $(-3i)^2$

1.4.13. $(8 - 6i) + (7 + 5i)$

1.4.14. $(5 - 3i) - (7 - 7i)$

1.4.15. $-5i(3 + 7i)$

1.4.16. $(3 - 4i)(2 + 6i)$

1.4.17. $-\frac{24}{6i}$

1.4.18. $\frac{13}{5i}$

Simplify. Leave your answer in standard form, $a + bi$.

1.4.19. $\frac{20}{2-i}$

1.4.20. $\frac{6+17i}{3+2i}$

1.4.21. $(3 - 4i)^2$

1.4.22. $\frac{3-i}{4-5i}$

1.4.23. $\left(2 + \sqrt{-7}\right)^2$

1.4.24. $7\sqrt{-12} + 2\sqrt{-75}$

1.4.25. $\left(-1 + \sqrt{-16}\right)^2$

1.4.26. $\frac{-8+\sqrt{-63}}{12}$

1.5.1. Define the word quadratic.

a. Write the equation in factored form. b. Solve the equation.

1.5.2. $x^2 - 3x - 40 = 0$

1.5.3. $10n^2 - n - 3 = 0$

1.5.4. $x^2 - 11x - 26 = 0$

1.5.5. $5a^2 + a = 2a^2 + 10$

1.5.6. $4y^2 + 3y - 7 = 0$

1.5.7. $20x^2 + 8x = 4 - x^2$

Solve using the square root property.

1.5.8. $30y^2 + 3 = 5y^2 + 7$

1.5.9. $4(y - 13)^2 = 36$

1.5.10. $11(x + 6)^2 = -44$

1.5.11. $2(n - 4)^2 = 26$

a. Fill in the blank to complete the perfect square trinomial.
b. Then write the trinomial as the square of a binomial.

1.5.12. $x^2 + 12x +$ _____

1.5.13. $x^2 - 6x +$ _____

Solve the equations by completing the square.

▌1.5.14. $3x^2 + 24x - 51 = 0$

▌1.5.15. $2x^2 - 32x + 178 = 0$

Use the quadratic formula to solve the equation. $x = \frac{-b\pm\sqrt{b^2-4ac}}{2a}$

1.5.16. $3x^2 - 5x + 2 = 0$

1.5.17. $2x^2 + 3x - 2 = 0$

▌1.5.18. $x^2 - 6x + 130 = 0$

▌1.5.19. $3x^2 - 2x - 80 = 0$

Complete the sentence.

1.5.20. If the discriminant of a quadratic equation is positive, then

_____.

1.5.21. If the discriminant of a quadratic equation is zero, then

_____.

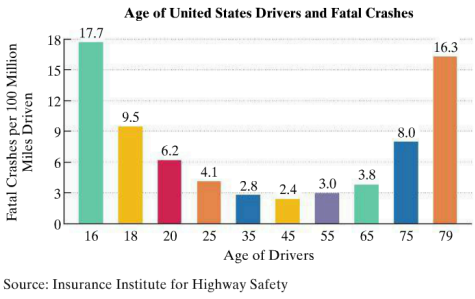
1.5.22. If the discriminant of a quadratic equation is negative, then

_____.

a. Find the discriminant of the equation. b. State how many and what type of solutions the equation has. Do not solve the equation.

1.5.23. $2x^2 + 5x - 3 = 0$ 1.5.24. $4x^2 + 4x + 1 = 0$ 1.5.25. $3x^2 - x + 2 = 0$

▌1.5.26. The number of fatal car crashes per 100 million miles, N, for drivers of age x can be approximated by the formula below. a. According to the formula, how many car crashes per 100 million miles driven will be had by 17 year olds? b. What age group(s) are expected to be involved in six fatal crashes per 100 million miles driven? $N = 0.013x^2 - 1.19x + 28.24$



Source: Insurance Institute for Highway Safety

▌1.5.27. The path of a thrown football can be modeled by the equation $y = -0.1x^2 + 1.2x + 6.4$, where y is the height of the football (in feet) and x is the football's horizontal distance (in feet) from the quarterback. How far does the ball travel before landing?

▌1.5.28. A football is thrown through the air, and it follows the path of a parabola. Its height is y (in meters), its horizontal distance traveled is x (in meters), and they are related by the equation $y = -0.02x^2 + 0.86x + 2.1$. What is the maximum distance that the football travels?

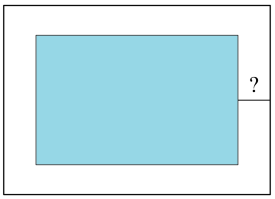
▌1.5.29. A rectangular park has dimensions of 435 yards by 380 yards. A path runs diagonally across the park from one corner to the opposite corner. How long is the path? Write an equation and solve it to answer the question.

▌1.5.30. A 32-foot-long ladder leans up against a building. The top of the ladder is 26 feet above the ground. How far from the bottom of the building is the bottom of the ladder? Write an equation and solve it to answer the question.

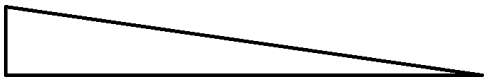
▌1.5.31. The length of a rectangular garden is 7 feet longer than it is wide. If the area of the garden is 228 square feet, what are the dimensions of the garden? Write an equation and solve it to answer the question.

▌1.5.32. The rectangular room is 6 feet longer than it is wide. If the area of the room is 59.89 square feet, what are the dimensions of the room? Write an equation and solve it to answer the question.

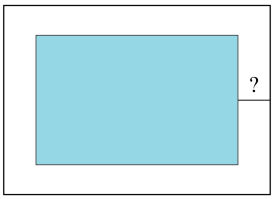
▌1.5.33. The dimensions of a swimming pool are 8 meters by 14 meters. The owner builds a walkway around the pool that has a uniform width. If the total area of the walkway and pool is 187 square meters, how wide is the walkway? Write an equation and solve it to answer the question.



▌1.5.34. A wheelchair ramp is 142 inches long, and the base of the ramp is 140 inches long. How high is the ramp at its top? Write an equation and solve it to answer the question.



▌1.5.35. The dimensions of a swimming pool are 10 meters by 16 meters. The owner builds a walkway around the pool that has a uniform width. If the total area of the walkway and pool is 352 square meters, how wide is the walkway? Write an equation and solve it to answer the question.



Solve the equation. Check your solutions.

1.6.1. $3\sqrt{5x - 7} = 12$

1.6.2. $9 + \sqrt[3]{x + 15} = 11$

1.6.3. $x = \sqrt{10x - 16}$

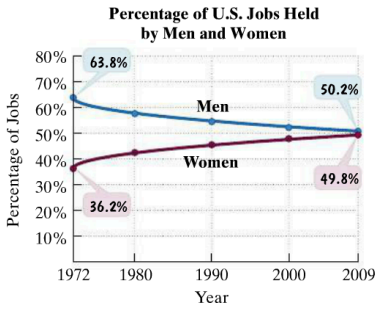
1.6.4. $\sqrt{15 - 2y} = y$

1.6.5. $\sqrt{18 - 6a} = a - 3$

1.6.6. $3 = x + \sqrt{x + 27}$

▌1.6.7. A basketball player's hang time is the time spent in the air when shooting a basket. The formula below models hang time, *t*, in seconds, in terms of the vertical distance of a player's jump, *d*, in feet. If a basketball player jumps and is in the air for 0.68 seconds, what is the vertical distance of his jump, rounded to the nearest tenth of a foot? $t = \frac{\sqrt{d}}{2}$

❙1.6.8. The formula below models the percentage of jobs in the U.S. labor force, p, held by women t years after 1972. a. What percent of the jobs were held by women in 2005? b. During which year did women hold 46% of the jobs? $p = 2.2\sqrt{t} + 36.2$



Source: Bureau of Labor Statistics

❙1.6.9. The formula below models the percentage of jobs in the U.S. labor force, p, held by men t years after 1972. During which year did men hold 56% of the jobs? $p = -2.2\sqrt{t} + 63.8$

❙1.6.10. Use your graphing calculator to graph the equation below in the given viewing window and solve the equation. $x^3 - 6x^2 + 4x + 15 = 0$ [−10, 10, 1] by [−10, 10, 1]

❙1.6.11. Use your graphing calculator to graph the equation below in the given viewing window and solve the equation. $x^3 - 76x^2 + 1{,}919x - 16{,}103 = 0$ [20, 30, 1] by [−20, 5, 1]

~~Solve the equation.~~

~~1.6.12. $(x + 2)^{3/2} + 3 = 30$~~

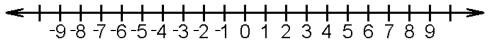
~~1.6.13. $x^{2/3} - \frac{3}{4} = -\frac{1}{2}$~~

~~1.6.14. $(c - 7)^{2/3} - 5 = 4$~~

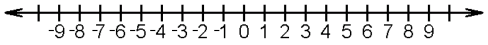
~~1.6.15. $(2x + 1)^{4/3} + 3 = 19$~~

Solve the inequality, and write the solution set in interval notation. Graph the solution set.

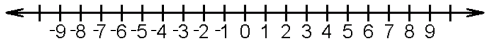
1.7.1. $\frac{3}{5}w + 4 > 7$



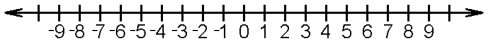
1.7.2. $30 - 4d \geq 10 + d$



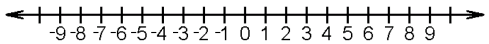
1.7.3. $\frac{3x+11}{2} < 4$



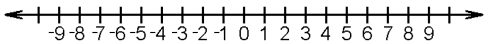
1.7.4. $5b + 3 \geq 5(b + 1) - b$



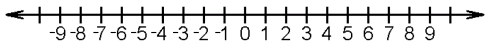
1.7.5. $4 - 3x < -2$ or $x + 3 < 3$



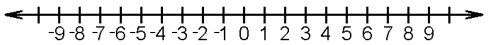
1.7.6. $w + 2 \leq 3$ and $2 - w < 5$



1.7.7. $5x - 2 \geq 8$ or $8 - 2x > 10$



1.7.8. $3 > \frac{n}{4} + 3 > 2$



Answer Key

1.2.1. Linear means first degree.
1.2.2. 1
1.2.3. $\frac{31}{7}$
1.2.4. 9
1.2.5. 1
1.2.6a. 0
1.2.6b. 2
1.2.7a. 0
1.2.7. $-\frac{6}{5}$
1.2.8a. −4
1.2.8b. –3
1.2.9a. −1
1.2.9b. No solution
1.2.10a. 0 and −5
1.2.10b. $-\frac{2}{5}$
1.2.11a. −4 and 3
1.2.11b. $-\frac{17}{10}$
1.2.12. $-\frac{20}{7}$
1.2.13a. 28.5%
1.2.13b. 2026
1.2.14a. Something close to $45,000.
1.2.14b. $44,395; The model matched the estimate well.
1.2.15. 3
1.2.16. 1.901

1.3.1. 35.77
1.3.2. 76.543%
1.3.3. 180.952
1.3.4. 132.6
1.3.5. 80.84
1.3.6. 45
1.3.7 $92.34
1.3.8. $65.83
1.3.9. $219,600
1.3.10. $58.09
1.3.11. $64.29
1.3.12. 8.772%
1.3.13. 20.8%
1.3.14. Multiply the number by 1.08.
1.3.15. Multiply the number by 0.86.
1.3.16. Percent means divide by 100.
1.3.17. 29.5 years
1.3.18. Jennifer's car is worth $12,500. Kira's car is worth $28,000.
1.3.19. 2017
1.3.20a. $y = 41{,}700 - 2{,}800x$
1.3.20b. $16,500
1.3.21. 17 miles
1.3.22. 16 uses
1.3.23. 2052
1.3.24. $2,200 in account A and $3,800 in account B
1.3.25. $6,800 in account A and $4,200 in account B
1.3.26. 74 meters by 222 meters
1.3.27. 11 feet by 14 feet
1.3.28. 4.5 centimeters
1.3.29. 4.2 years eating, 8.8 years watching TV
1.3.30. Computer science: $55,600; Economics: $48,600; Biology: $38,600
1.3.31a. 22 months
1.3.31b. $599
1.3.32. 11.6 miles

1.4.1. A complex number is a number that can be written in the form $a + bi$, where a and b are real numbers.
1.4.2. The number i is an abbreviation for $\sqrt{-1}$, and i^2 equals −1.
1.4.3. $7i$
1.4.4. $i\sqrt{11}$
1.4.5. $14 + 9i$
1.4.6. $5 + 6i$
1.4.7. $35i$
1.4.8. 20
1.4.9. −36
1.4.10. −9
1.4.13. $15 - i$
1.4.14. $-2 + 4i$

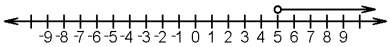
1.4.15. $35 - 15i$
1.4.16. $30 + 10i$
1.4.17. $4i$
1.4.18. $-\frac{13}{5}i$
1.4.19. $8 + 4i$
1.4.20. $4 + 3i$
1.4.21. $-7 - 24i$
1.4.22. $\frac{17}{41} + \frac{11}{41}i$
1.4.23. $-3 + 4i\sqrt{7}$
1.4.24. $24i\sqrt{3}$
1.4.25. $-15 - 8i$
1.4.26. $-\frac{2}{3} + \frac{i\sqrt{7}}{4}$

1.5.1. Quadratic means second degree.
1.5.2a. $(x - 8)(x + 5) = 0$
1.5.2b. -5 and 8
1.5.3a. $(5n - 3)(2n + 1) = 0$
1.5.3b. $-\frac{1}{2}$ and $\frac{3}{5}$
1.5.4a. $(x - 3)(x + 2) = 0$
1.5.4b. -2 and 13
1.5.5a. $(3a - 5)(a + 2) = 0$
1.5.5b. -2 and $\frac{5}{3}$
1.5.6a. $(4y \_ 7)(y - 1) = 0$
1.5.6b. $-\frac{7}{4}$ and 1
1.5.7a. $(3x + 2)(7x - 2) = 0$
1.5.7b. $-\frac{2}{3}$ and $\frac{2}{7}$
1.5.8. $-\frac{2}{5}$ and $\frac{2}{5}$
1.5.9. 10 and 16
1.5.10. $-6 \pm 2i$
1.5.11. $4 \pm \sqrt{13}$
1.5.12a. 36
1.5.12b. $(x + 6)^2$
1.5.13a. 9
1.5.13b. $(x - 3)^2$
1.5.14. -9.745 and 1.745
1.5.15. $8 \pm 5i$
1.5.16. $\frac{2}{3}$ and 1
1.5.17. -2 and $\frac{1}{2}$
1.5.18. $3 \pm 11i$
1.5.19. -4.841 and 5.508
1.5.20. If the discriminant of a quadratic equation is positive, then the equation has two real solutions.
1.5.21. If the discriminant of a quadratic equation is zero, then the equation has one real solution.
1.5.22. If the discriminant of a quadratic equation is negative, then the equation has two complex solutions.
1.5.23a. 49
1.5.23b. Two real solutions
1.5.24a. 0
1.5.24b. One real solution
1.5.25a. -23
1.5.25b. Two complex imaginary solutions
1.5.26a. 11.767 crashes (per 100 million miles driven)
1.5.26b. 65.367 year olds and 26.172 year olds
1.5.27. 16 feet
1.5.28. 45.317 meters
1.5.29. 577.603 yards
1.5.30. 18.655 feet
1.5.31. 12 feet by 19 feet
1.5.32. 5.3 feet × 11.3 feet
1.5.33. 1.5 meters
1.5.34. 23.749 inches
1.5.35. 3 meters

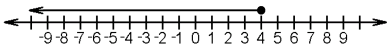
1.6.1. $\frac{23}{5}$
1.6.2. -7
1.6.3. 2, 8
1.6.4. 3 (but not -5)
1.6.5. 3 (but not -3)
1.6.6. -2 (but not 9)
1.6.7. 1.85 feet
1.6.8a. 48.838%
1.6.8b. 1991 (19.84)
1.6.9. 1984 (12.57)
1.6.10. -1.193, 3, 4.193
1.6.11. 23.412, 24.406, 28.182
1.6.12. 7
1.6.13. $-\frac{1}{8}, \frac{1}{8}$
1.6.14. -20, 34

1.6.15. $-\frac{9}{2}, \frac{7}{2}$

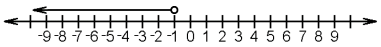
1.7.1. $(5, \infty)$



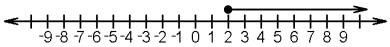
1.7.2. $(-\infty, 4]$



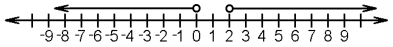
1.7.3. $(-\infty, -1)$



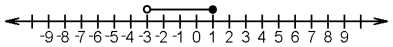
1.7.4. $[2, \infty)$



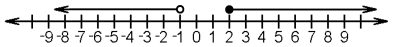
1.7.5. $(-\infty, 0) \cup (2, \infty)$



1.7.6. $(-3, 1]$



1.7.7. $(-\infty, -1) \cup [2, \infty)$



1.7.8. $(-4, 0)$