

## Answer Key

Solve each equation.

1. $-3x - 9 = -27$ $x = 6$	2. $25 + 2(n + 2) = 30$ $n = \frac{1}{2}$	3. $-9b - 6 = -3b + 48$ $b = -9$
4. $5 - (m - 4) = 2m + 3(m - 1)$ $m = 2$	5. $-24 - 10k = -8(k + 4) - 2k$ no solution	6. $f - (-19) = 11f + 23 - 20f$ $f = \frac{2}{5}$
7. $\frac{3}{4}d - \frac{1}{2} = \frac{3}{8} + \frac{1}{2}d$ $d = \frac{7}{2}$ or $3\frac{1}{2}$	8. $-0.5g + 13 = 3g$ $g = \frac{26}{7}$ or $3\frac{5}{7}$	9. $-5(h + 12) - (4h - 2) = h - 8$ $h = -5$
10. $ 3x + 4  = 16$ $x = \{-\frac{20}{3}, 4\}$ or $\{-\frac{62}{3}, 4\}$	11. $3 x - 5  = 27$ $x = \{-4, 14\}$	12. $-8 2x - 6  + 4 = -60$ $x = \{-1, 7\}$

Solve each word problem algebraically.

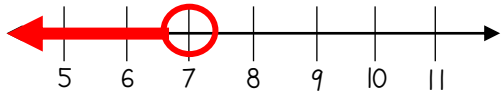
13. The sum of two consecutive integers is one less than three times the smaller integer. Find the two integers. $x = 1^{\text{st}} \text{ integer}$ $x + 1 = 2^{\text{nd}} \text{ integer}$ $x + (x + 1) = 3x - 1$ $x = 2$ The integers are 2 & 3	14. The length of a rectangular picture is 5 inches more than three times the width. Find the dimensions of the picture if its perimeter is 74 inches. $w = \text{width}$ $3w + 5 = \text{length}$ $2(w) + 2(3w + 5) = 74$ $w = 8$ Width = 8 in & Length = 29 in
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# Answer Key

Solve each inequality. Graph the solution on a number line.

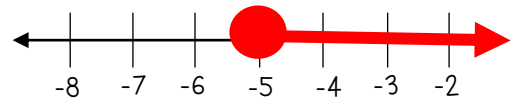
15.  $-6x + 3 > -39$

$x < 7$



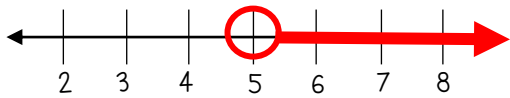
16.  $25 - 3(n - 2) \geq -8n + 6$

$n \geq -5$



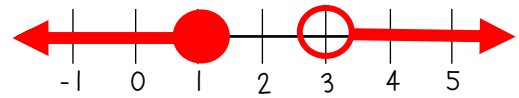
17.  $8g - 6(g + 1) < 4(2g - 9)$

$g > 5$



18.  $7k + 1 \leq 8$  or  $-7 < k - 10$

$k \leq 1$  or  $k > 3$



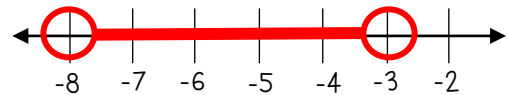
19.  $-4 < 3b + 2 \leq 20$

$-2 < b \leq 6$



20.  $9 < -3m < 24$

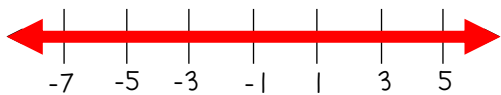
$-8 < m < -3$



21.  $y + (-6) \geq -13$  or  $-3y + 8 > -7$

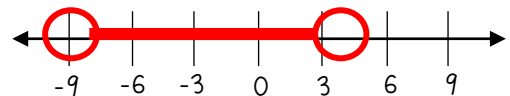
$y \geq -7$  or  $y < 5$

→ All Real Numbers



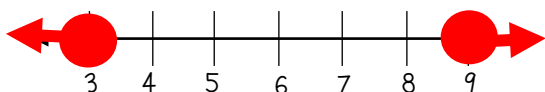
22.  $|2x + 5| < 13$

$-9 < x < 4$



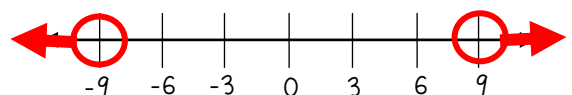
23.  $7|w - 6| \geq 21$

$w \geq 9$  or  $w \leq 3$



24.  $-2|3m| + 3 < -51$

$m > 9$  or  $m < -9$

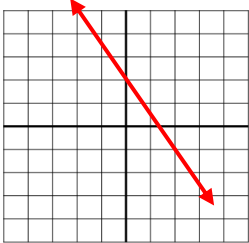
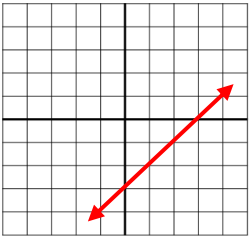
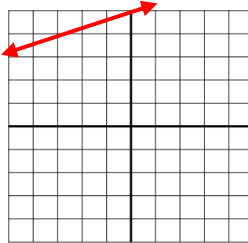
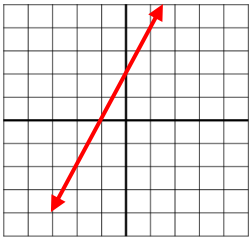
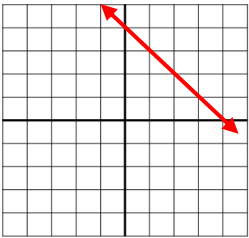
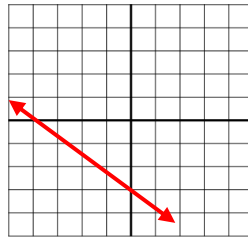
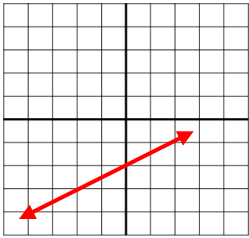
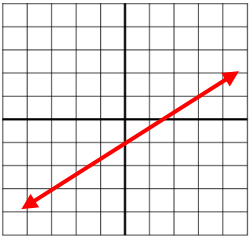
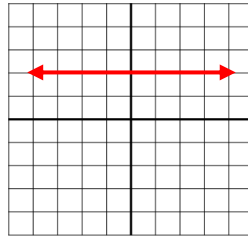


## Answer Key

Find the slope of the line that passes through the pair of points.

25. $(9, -3)$ and $(9, -8)$  $m = \text{undefined}$	26. $(-8, 5)$ and $(3, -6)$  $m = -1$	27. $(7, -1)$ and $(15, 9)$  $m = \frac{5}{4}$
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Graph each line.

28. $y = -\frac{3}{2}x + 2$ 	29. $y = x - 3$ 	30. $y = \frac{1}{3}x + 5$ 
31. $2x - y = -2$ 	32. $x + y = 4$ 	33. $3x + 4y = -12$ 
34. $y + 3 = \frac{1}{2}(x + 2)$ 	35. $y - 1 = \frac{2}{3}(x - 3)$ 	36. $y - 2 = 0$ 

Write the equation of the line in point-slope, slope-intercept, and standard form.

37. Line passing through point $(3, 5)$ with a slope of 1 $P\text{-}S: y - 5 = x - 3$ $S\text{-}I: y = x + 2$ $Std: x - y = -2$	38. Line passing through points $(-4, 2)$ and $(0, 3)$ $P\text{-}S: y - 2 = \frac{1}{4}(x + 4)$ or $y - 3 = \frac{1}{4}x$ $S\text{-}I: y = \frac{1}{4}x + 3$ $Std: x - 4y = -12$	39. Line passing through points $(1, 3)$ and $(2, 5)$ $P\text{-}S: y - 3 = 2(x - 1)$ or $y - 5 = 2(x - 2)$ $S\text{-}I: y = 2x + 1$ $Std: 2x - y = -1$
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## Answer Key

Determine whether the lines are parallel, perpendicular, or neither. Justify your answer.

40.  $y = 2x - 8$   
 $y = \frac{1}{2}x + 6$

Neither (the slopes are reciprocals but not opposite signs)

41.  $y = x$   
 $x + y = -2$

Perpendicular (the slopes are opposite reciprocals)

42.  $3x + 2y = 18$   
 $y + 4 = -\frac{3}{2}(x - 4)$

Parallel (the slopes are equal and y-intercepts are different)

Write the equation of the line parallel to the given line that passes through the given point in slope-intercept form.

43.  $y = -4x - 2$ ;  $(0, -1)$

$$y = -4x - 1$$

44.  $2x - y = -4$ ;  $(2, 5)$

$$y = 2x + 1$$

Write the equation of the line perpendicular to the given line that passes through the given point in slope-intercept form.

45.  $y = \frac{2}{3}x - 9$ ;  $(-6, -2)$

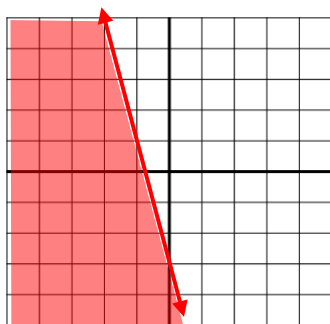
$$y = -\frac{3}{2}x - 11$$

46.  $4x + y = -6$ ;  $(4, 5)$

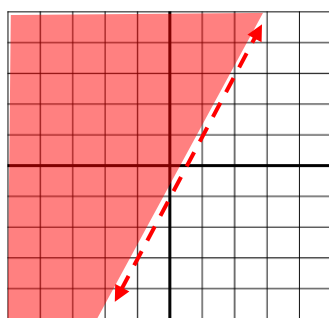
$$y = \frac{1}{4}x + 4$$

Graph the solution to each linear inequality.

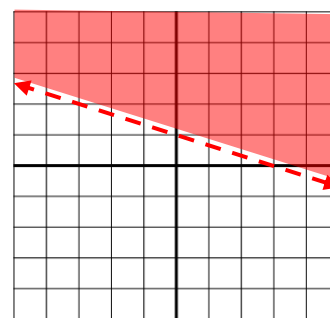
47.  $y \leq -4x - 3$



48.  $2x - y < 1$



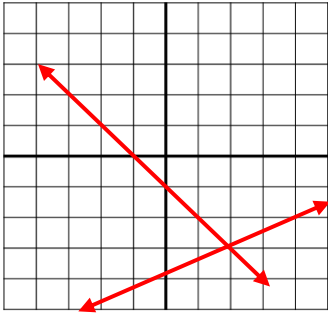
49.  $x + 3y > 3$



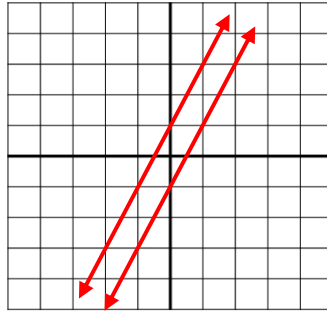
## Answer Key

Solve each system of equations by graphing.

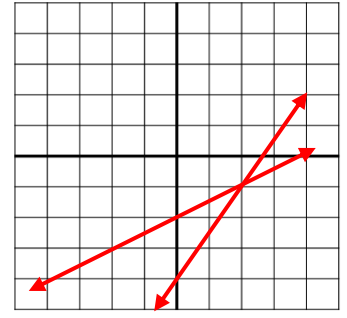
$$50. \begin{cases} y = \frac{1}{2}x - 4 \\ y = -x - 1 \end{cases} \quad (2, -3)$$



$$51. \begin{cases} y = 2x + 1 \\ -y = -2x + 1 \end{cases} \quad \text{no solution}$$



$$52. \begin{cases} x - 2y = 4 \\ -3x + 2y = -8 \end{cases} \quad (2, -1)$$



Solve each system of equations using substitution.

$$53. \begin{cases} y = 2x + 3 \\ 5x - 2y = -6 \end{cases} \quad (0, 3)$$

$$54. \begin{cases} x + 4y = 5 \\ -2x + 5y = 16 \end{cases} \quad (-3, 2)$$

$$55. \begin{cases} 9y - 7x = -13 \\ -9x + y = 15 \end{cases} \quad (-2, -3)$$

Solve each system of equations using elimination.

$$56. \begin{cases} 3x - 7y = -29 \\ -4x + 7y = 27 \end{cases} \quad (2, 5)$$

$$57. \begin{cases} -4x - 8y = -48 \\ 8x + 3y = -34 \end{cases} \quad (-8, 10)$$

$$58. \begin{cases} 3x - 7y = 21 \\ 6x = 14y + 42 \end{cases} \quad \text{infinitely many solutions}$$

Solve each word problem using a system of equations.

59. Joe bought 5 apples and 4 bananas for \$6. Dawn bought 3 apples and 6 bananas for \$6.30. How much does each apple and each banana cost?

Let  $a$  = cost of one apple  
Let  $b$  = cost of one banana

$$\begin{aligned} 5a + 4b &= 6 \\ 3a + 6b &= 6.30 \end{aligned}$$

$a = .6, b = .75 \rightarrow$  Each apple is \$0.60 & each banana is \$0.75.

60. Wesley and Brian have a total of 87 baseball cards. Wesley has 30 less than twice as many cards as Brian. How many baseball cards do they each own?

Let  $w$  = # of cards Wesley owns  
Let  $b$  = # of cards Brian owns

$$\begin{aligned} w + b &= 87 \\ w &= 2b - 30 \end{aligned}$$

$w = 48, b = 39 \rightarrow$  Wesley has 48 cards and Brian has 39 cards.

## Answer Key

Simplify each expression completely. Write your answer using only positive exponents.

61. $x^6 \cdot x^4$ $x^{10}$	62. $(5^3)^2$ $5^6 = 15,625$	63. $-6a^2b^{-4}c \cdot 4ab^2$ $\frac{-24a^3c}{b^2}$
64. $\frac{a^3b^{-6}}{c^{-2}}$ $\frac{a^3c^2}{b^6}$	65. $\left(\frac{-2x^6y}{3z^5}\right)^3$ $\frac{-8x^{18}y^3}{27z^{15}}$	66. $(8w^3q^{-5})^0$ 1
67. $\frac{24d^5f^{-5}g^8}{36d^{-3}f^9g^2}$ $\frac{2d^8g^6}{3f^{14}}$	68. $(2b^{-3}d^6)^4 \cdot 3b^7d$ $\frac{48d^{25}}{b^5}$	69. $\left(\frac{-4a^4b^2c^{-1}}{6a^9}\right)^{-1}$ $\frac{-3a^5c}{2b^2}$

Find each product or quotient. Write your answer in Scientific Notation.

70. $(9.8 \times 10^3)(2.4 \times 10^7)$ $2.352 \times 10^{11}$	71. $\frac{9.3 \times 10^3}{3 \times 10^9}$ $3.1 \times 10^{-6}$	72. $\frac{4.5 \times 10^{13}}{9.0 \times 10^7}$ $5 \times 10^5$
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Find the new amount.

73. The population of Watesville decreases at a rate of 1.6% per year. If the population was 62,500 in 2014, what will it be in 2020? $56,735$ people	74. A population of 30 bunnies is increasing at a rate of 40% per year. How many bunnies will there be in 5 years? 161 bunnies	75. If you \$15,000 in an account with a 4.5% interest rate, compounded quarterly, how much money will you have in 25 years? \$45,913.96
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## Answer Key

Classify each polynomial by its degree and number of terms.

76. $8x^3 - 9x$ cubic binomial	77. $-2 - 4x^2 + 7x$ quadratic trinomial	78. $8x^2y^2$ quartic monomial	79. $6x + 5$ linear binomial
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Find each sum or difference. Write your answer in Standard Form.

80. $(2h^3 + 6h) + (3h^3 - 7h - 3)$ $5h^3 - h - 3$	81. $(8x - 4x^2 + 3) - (7x^2 - 9)$ $-11x^2 + 8x + 12$	82. $(-14a^2 - 5) - (5a^2 + 6a - 7)$ $-19a^2 - 6a + 2$
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Find each product. Write your answer in Standard Form.

83. $5x^3(9x^2 + 4x - 5)$ $45x^5 + 20x^4 - 25x^3$	84. $(x + 4)(x - 3)$ $x^2 + x - 12$	85. $(3n - 8)(4n - 7)$ $12n^2 - 53n + 56$
86. $(2x + 3)(x^2 + x + 3)$ $2x^3 + 5x^2 + 9x + 9$	87. $(6x + 1)^2$ $36x^2 + 12x + 1$	88. $4g(2g - 9)(2g + 9)$ $16g^3 - 324g$

Simplify each expression completely. Write your answer in Standard Form.

89. $(x + 2)(x + 8) + (4x^2 + 8x - 3)$ $5x^2 + 18x + 13$	90. $(x + 5)(x - 5) - 6x(x + 1)$ $-5x^2 - 6x - 25$
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# Answer Key

Factor each polynomial completely.

91. $-18x - 27$ $-9(2x + 3)$	92. $x^2 - 100$ $(x + 10)(x - 10)$	93. $x^2 - 5x + 6$ $(x - 2)(x - 3)$
94. $2x^2 + 7x + 6$ $(x + 2)(2x + 3)$	95. $5x^3 + 3x^2 + 10x + 6$ $(x^2 + 2)(5x + 3)$	96. $3x^2 - 12$ $3(x + 2)(x - 2)$
97. $x^2 + 24x + 144$ $(x + 12)^2$	98. $9x^3 - 30x^2 - 24x$ $3x(3x + 2)(x - 4)$	99. $8x^3 + 4x^2 - 6x - 3$ $(4x^2 - 3)(2x + 1)$
100. $5x^2 + 10x - 45$ $5(x^2 + 2x - 9)$	101. $36x^4 - 121$ $(6x^2 + 11)(6x^2 - 11)$	102. $5x^2 + 22x + 8$ $(5x + 2)(x + 4)$
103. $4x + 16xy + 9y + 36y^2$ $(4x + 9y)(1 + 4y)$	104. $x^2 - 3x - 88$ $(x - 11)(x + 8)$	105. $4x^2 - 15x + 9$ $(4x - 3)(x - 3)$

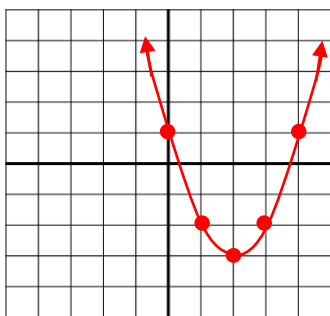


# Answer Key

Graph each quadratic equation.

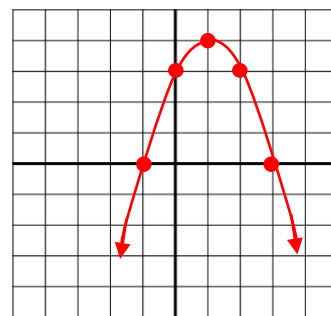
106.  $y = x^2 - 4x + 1$

x	y
0	1
1	-2
2	-3
3	-2
4	1



107.  $y = -x^2 + 2x + 3$

x	y
-1	0
0	3
1	4
2	3
3	0



Solve each quadratic equation using the method of your choice. Round to the nearest tenth.

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

$x = \{1, 2\}$

109.  $4x^2 - 40 = 0$

$x \approx \{\pm 3.2\}$

110.  $2x^2 + x = 45$

$x = \{4.5, -5\}$

111.  $7x^2 + 5x = -2$

no real solution

112.  $x^2 - 9x = 0$

$x = \{0, 9\}$

113.  $x^2 - 20x = 84$

$x \approx \{-3.6, 23.6\}$

114.  $-15x^2 = -900$

$x \approx \{\pm 7.7\}$

115.  $-5x^2 + 17x + 13 = 0$

$x \approx \{-0.6, 4.0\}$

116.  $x^2 - 24x + 22 = -22$

$x = \{2, 22\}$

Solve each word problem using a quadratic equation.

117. The height of an object  $t$  seconds after it is thrown from a height of  $h$  feet is modelled by the equation  $h(t) = -16t^2 + vt + h$ . If the ball is thrown from a point 6 feet above ground with an initial velocity,  $v$ , of 30 feet per second, how long will it take for the ball to hit the ground?

$0 = -16t^2 + 30t + 6$

It will take about 2.1 seconds.

118. The length of a rectangle is 3mm less than four times the width. If the area of the rectangle is 1,387 mm<sup>2</sup>, what are the dimensions of the rectangle?

$w = \text{width}$

$4w - 3 = \text{length}$

$w(4w - 3) = 1387$

$\rightarrow 4w^2 - 3w - 1387 = 0$

$w = 19$

The width is 19mm & length is 73 mm.

# Answer Key

Simplify each radical.

119. $\sqrt{90}$ $3\sqrt{10}$	120. $\sqrt{54a^3b^4}$ $3ab^2\sqrt{6a}$	121. $\sqrt{600x^2y^2z}$ $10xy\sqrt{6z}$
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Simplify each radical expression.

122. $\sqrt{18} - \sqrt{50}$ $-2\sqrt{2}$	123. $2\sqrt{5}(\sqrt{3} + 8\sqrt{4})$ $2\sqrt{15} + 32\sqrt{5}$	124. $\frac{5}{\sqrt{3}}$ $\frac{5\sqrt{3}}{3}$
125. $7\sqrt{3} + 2\sqrt{12} - 3\sqrt{27}$ $2\sqrt{3}$	126. $(\sqrt{2} + 3\sqrt{3}) \cdot (\sqrt{6} - 4\sqrt{2})$ $2\sqrt{3} - 8 + 9\sqrt{2} - 12\sqrt{6}$	127. $\frac{2}{\sqrt{5} - \sqrt{3}}$ $\sqrt{5} + \sqrt{3}$

Solve each radical equation.

128. $\sqrt{3x} - 27 = 0$ $x = 243$	129. $\sqrt{2x + 11} = \sqrt{6x - 7}$ $x = 4.5$	130. $\sqrt{4x + 1} = x - 1$ $x = 6$
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