

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 $\{-\frac{6^2}{3}, 4\}$	11. $3 x - 5 = 27$ $x = \{-4, 14\}$	12. $-8 2x - 6 + 4 = -60$ $x = \{-1, 7\}$

Solve each word problem algebraically.

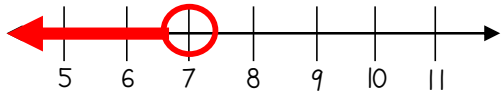
13. The sum of two consecutive integers is one less than three times the smaller integer. Find the two integers. $x = 1^{\text{st}} \text{ integer}$ $x + 1 = 2^{\text{nd}} \text{ integer}$ $x + (x + 1) = 3x - 1$ $x = 2$ The integers are 2 & 3	14. The length of a rectangular picture is 5 inches more than 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.

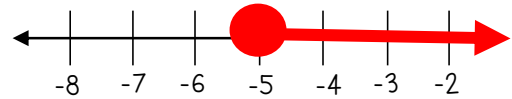
15. $-6x + 3 > -39$

$x < 7$



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

$n \geq -5$



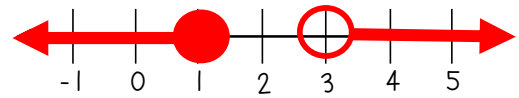
17. $8g - 6(g + 1) < 4(2g - 9)$

$g > 5$



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

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



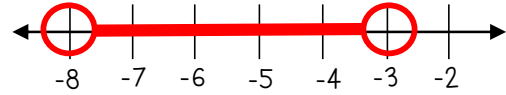
19. $-4 < 3b + 2 \leq 20$

$-2 < b \leq 6$



20. $9 < -3m < 24$

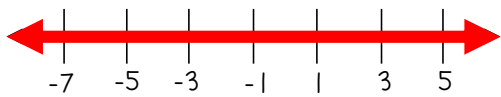
$-8 < m < -3$



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

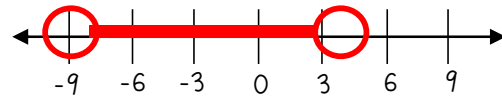
$y \geq -7$ or $y < 5$

→ All Real Numbers



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

$-9 < x < 4$



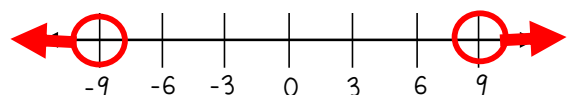
23. $7|w - 6| \geq 21$

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



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

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

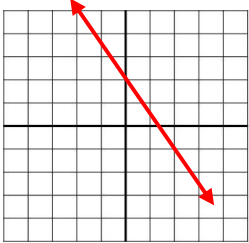
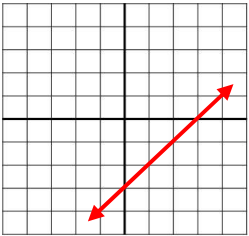
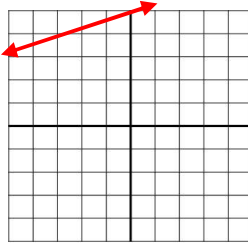
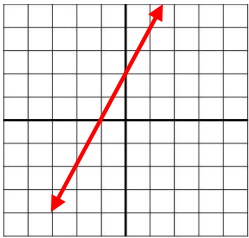
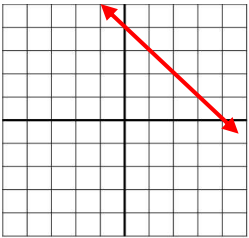
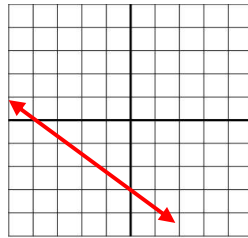
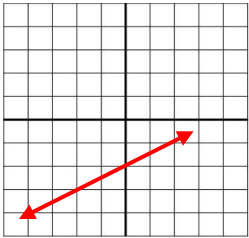
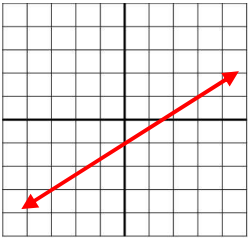
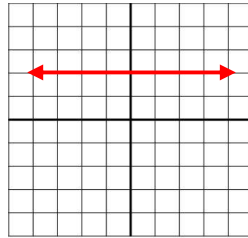


Answer Key

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-S: $y - 5 = x - 3$ S-I: $y = x + 2$ Std: $x - y = -2$	38. Line passing through points $(-4, 2)$ and $(0, 3)$ P-S: $y - 2 = \frac{1}{4}(x + 4)$ or $y - 3 = \frac{1}{4}x$ S-I: $y = \frac{1}{4}x + 3$ Std: $x - 4y = -12$	39. Line passing through points $(1, 3)$ and $(2, 5)$ P-S: $y - 3 = 2(x - 1)$ or $y - 5 = 2(x - 2)$ S-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. $y = \frac{2}{3}x - 9$; $(-6, -2)$

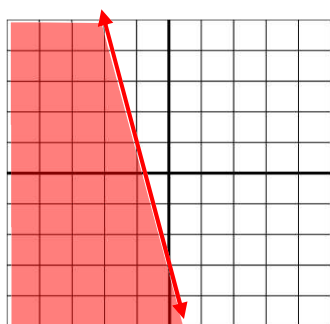
$$y = -\frac{3}{2}x - 11$$

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

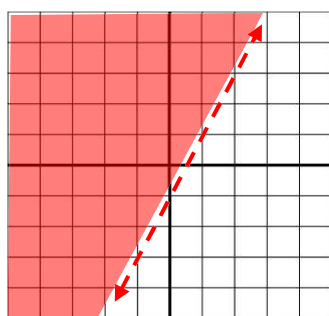
$$y = \frac{1}{4}x + 4$$

Graph the solution to each linear inequality.

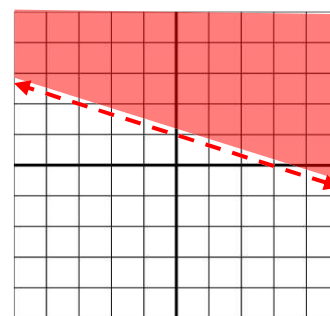
47. $y \leq -4x - 3$



48. $2x - y < 1$



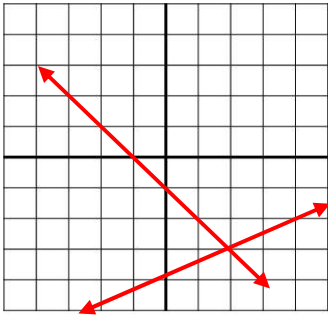
49. $x + 3y > 3$



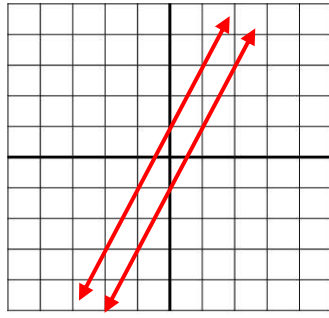
Answer Key

Solve each system of equations by graphing.

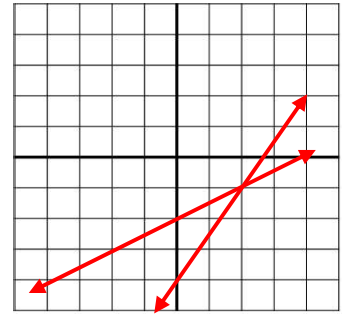
50.
$$\begin{cases} y = \frac{1}{2}x - 4 \\ y = -x - 1 \end{cases}$$
 (2, -3)



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



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



Solve each system of equations using substitution.

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

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

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

Solve each system of equations using elimination.

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

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

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

$$5a + 4b = 6$$

$$3a + 6b = 6.30$$

a = .6, b = .75 → 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

$$w + b = 87$$

$$w = 2b - 30$$

w = 48, b = 39 → 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. $(9.8 \times 10^3)(2.4 \times 10^7)$ 2.352×10^{11}	71. $\frac{9.3 \times 10^3}{3 \times 10^9}$ 3.1×10^{-6}	72. $\frac{4.5 \times 10^{13}}{9.0 \times 10^7}$ 5×10^5
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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

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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Answer Key

93. $P = 34 \text{ cm};$
 $A = 48 \text{ cm}^2$

94. $C = 72.22 \text{ mm};$
 $A = 415.265 \text{ mm}^2$

97. $SA = 384 \text{ cm}^2;$
 $V = 512 \text{ cm}^3$

98. $SA = 132 \text{ in}^2;$
 $V = 72 \text{ in}^3$

91. \$46.40

95. $P = 22 \text{ in};$
 $A = 26 \text{ in}^2$

99. $SA = 439.6 \text{ cm}^2;$
 $V = 461.58 \text{ cm}^3$

96. $P = 63.7 \text{ m};$
 $A = 229.25 \text{ m}^2$

100. $SA = 494.55 \text{ mm}^2;$
 $V = 826.605 \text{ mm}^3$

Solve each proportion, showing all work.

$$76. \frac{6}{7} = \frac{4}{m}$$

$$m = 4.\bar{6}$$

$$77. \frac{12}{5} = \frac{k}{3}$$

$$k = 7.2$$

$$78. \frac{h}{7} = \frac{8}{2}$$

$$h = 28$$

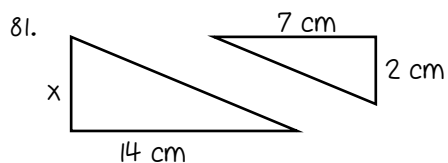
$$79. \frac{22}{n} = \frac{9}{36}$$

$$h = 88$$

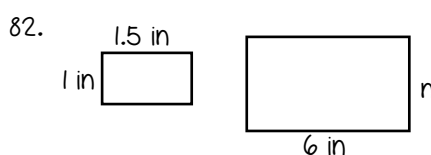
$$80. \frac{4}{21} = \frac{3}{c}$$

$$h = 15.75$$

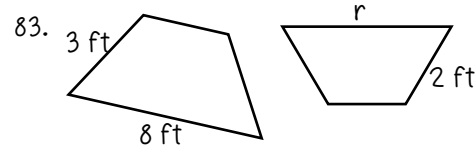
Assume each pair of figures is similar. Find the missing side length to the nearest tenth.



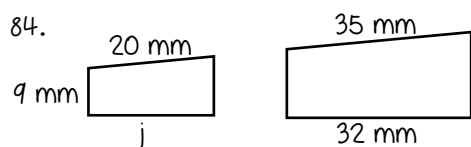
$$x = 4 \text{ cm}$$



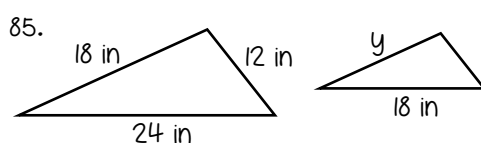
$$x = 4 \text{ in}$$



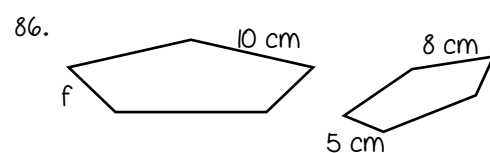
$$x = 5.\bar{3} \text{ ft}$$



$$j \approx 18.3 \text{ mm}$$



$$y = 13.5 \text{ in}$$



$$f = 6.25 \text{ cm}$$

Find the missing side length in each right triangle to the nearest tenth. Show your work!

87. $a = 6, b = 8, c = ?$

$$c = 10 \text{ units}$$

88. $a = ?, b = 9 \text{ cm}, c = 13 \text{ cm}$

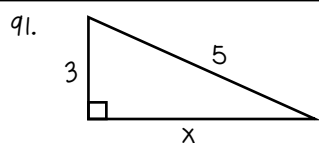
$$a \approx 9.4 \text{ cm}$$

89. $a = 7, b = ?, c = 14$

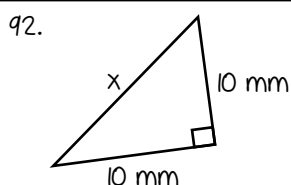
$$b \approx 12.1 \text{ units}$$

90. $a = 14 \text{ in}, b = 14 \text{ in}, c = ?$

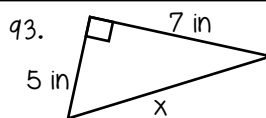
$$c \approx 19.8 \text{ in}$$



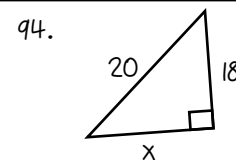
$$x = 4 \text{ units}$$



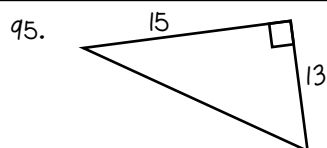
$$x \approx 14.1 \text{ mm}$$



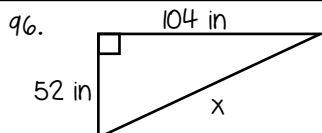
$$x \approx 8.6 \text{ in}$$



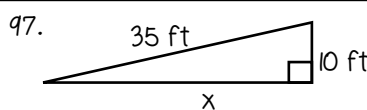
$$x \approx 8.7 \text{ units}$$



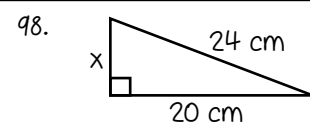
$$x \approx 19.8 \text{ units}$$



$$x \approx 116.3 \text{ in}$$



$$x \approx 33.5 \text{ ft}$$



$$x \approx 13.3 \text{ cm}$$

Determine whether or not you can form a right triangle from the given side lengths. Explain.

99. 18, 22, 26

$$\text{No; } 18^2 + 22^2 \neq 26^2$$

100. 5, 12, 13

$$\text{Yes; } 5^2 + 12^2 = 13^2$$