Chapter 1

1.1.1:

1-3. Shapes (a), (c), (d), and (e) are rectangles.

1-4. **a:** 40 **b:** –6 **c:** 7 **d:** 59

1-5. **a:** $y = x + 3$ **b:** $y = -x^2$ **c:** $y = x^2 + 3$ **d:** $y = 3x - 1$

1-6. **a:** $22a + 28$ **b:** $-23x - 17$ **c:** $x^2 + 5x$ **d:** $x^2 + 8x$

1-7. Possibilities: goes to bank, gets money from parent, gets paid; buys lunch, goes shopping, pays a bill, …

1.1.2:

1-14. Answers vary. Possible responses include "How many sides does it have?", "Does it have a right angle?", "Are any sides parallel?"

1-15. Answers vary. Possible responses include "They have 3 sides of equal length" and "They have 3 angles of equal measure."

1-16. **a:** 3 **b:** 2 **c:** 4

1-17. **a:** $x = -7$ **b:** $c = 4.5$ **c:** $x = 16$ **d:** $k = -7$

1-18. **a:** 12 **b:** 35 **c:** 24 **d:** 7

1.1.3:

1-25. c is correct; $x = 7$

1-26. No. If the points are collinear then they will not form a triangle.

1-27. $y = x - 3$

1-28. **a:** 55.5 square units **b:** 42 square units

1.1.4:

1-32. **a:** $x = \frac{9}{24} = \frac{3}{8} = 0.375$ **b:** no solution
c: $x \approx 6.44$ **d:** $x = 0.5$

1-33. Yes, his plants will be dead. If his plants are indoors, they will be dead because he will be gone for 2 weeks and so he did not water them at least once a week. If he left them outdoors, they will still be dead because it has not rained for 2 weeks, so he needed to water them once a week as well.

1-34. **a:** $y = \frac{2}{3}x - 4$ **b:** $y = -\frac{5}{2}x + \frac{7}{2}$

1-35. 104 sq. mm

1-36. **a:** $-\frac{3}{5}$ **b:** $\frac{6}{3} = \frac{2}{1} = 2$ **c:** $-\frac{3}{6} = -\frac{1}{2}$ **d:** $\frac{0}{7} = 0$

1.1.5:

1-42. **a:** 100° **b:** 170° **c:** 50°

1-43. The graph should be a line with y-intercept (0, 2) and x-intercept (–2, 0).

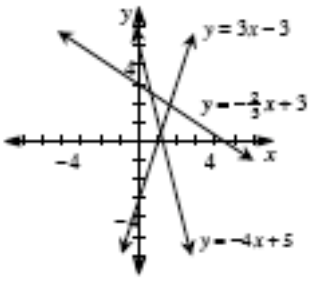
1-44. Perimeter: 74 centimeters, Area: 231 cm^2

1-45. **a:** $y = 5$ **b:** $r = 12$ **c:** $a = 6$ **d:** $m = 5$

1-46. While there are an infinite number of rectangles, possible dimensions with integral measurements are: 1 by 24 (perimeter = 50 units), 2 by 12 (perimeter = 28 units), 3 by 8 (perimeter = 22 units), and 4 by 6 (perimeter = 20 units).

1.2.1:

1-54.



1-55. **a:** 120° **b:** 40° **c:** 230°

1-56. $5x - 2 + 2x + 6 = 67$, $x = 9$, so $5(9) - 2 = 43$ miles

1-57. **a:** 3.75 **b:** 3 **c:** 0 **d:** 3 **e:** ≈ 372.25 **f:** -3.4

1-58. The flag would need to be a rectangle. The height of the cylinder would match the height of the rectangle along the pole, and the cylinder's radius would match the width of the rectangle.

1.2.2:

1-63. yes, yes, no

1-64. **a:** reflection **b:** translation (or two reflections over parallel lines)
c: rotation or rotation and translation
d: rotation or rotation and translation depending on the point of rotation
e: reflection **f:** reflection and then translation or rotation or both

1-65. $19 + 7x - 4 + 10x + 3 = 52$ so $x = 2$. Side lengths are 19, 10, and 23.

1-66. **a:** Area $\approx$ 16 square units **b:** Area $\approx$ 15 square units

1-67. **a:** -4 **b:** 25 **c:** -2

1.2.3:

1-73. **a:** a square **b:** 81 square units
c: $A'(3,-5)$, $B'(-6,-5)$, $C'(-6,4)$, $D'(3,4)$

1-74. **a:** $x = -4.75$ **b:** $x = -94$ **c:** $x \approx 1.14$ **d:** $a = 22$

1-75. y-intercept: (0, 6), x-intercept: (4, 0)

1-76. **a:** $y = \frac{4}{3}x - 2$

b: The resulting line coincides with the original line; $y = \frac{4}{3}x - 2$

1-77. -14

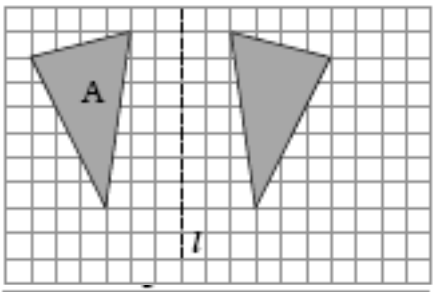
1.2.4:

1-82. \$450

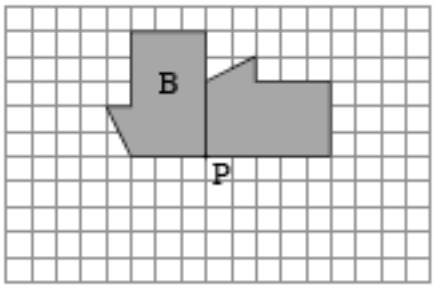
1-83. **a:** $(9,3)$ **b:** $(3,-3)$ **c:** $(-2,-7)$ **d:** $(-52,1483)$

1-84. **a:** 10 square units **b:** 20 square units **d:** 208,680 square units

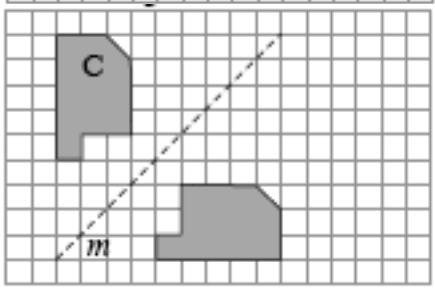
1-85. **a:**



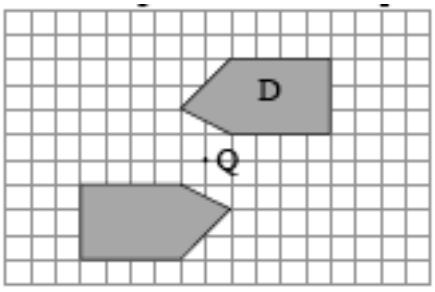
b:



c:



d:



1-86. **a:** The orientation of the hexagon does not change.
b: The orientation of the hexagon does not change.
c: There are 6 lines of symmetry, through opposite vertices and through the midpoints of opposite sides.

1.2.5:

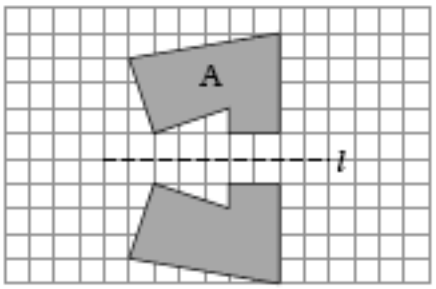
1-92. (a) and (b) are perpendicular, while (b) and (c) are parallel.

1-93. **a:** One possibility: $4(5x+2)=48$ **b:** $x=2$ **c:** $12\cdot12=144$ units

1-94. **a:** heart **b:** square **c:** hexagon **d:** Answers vary.

1-95. The triangles described in (a), (b), and (d) are isosceles.

1-96. **a:**



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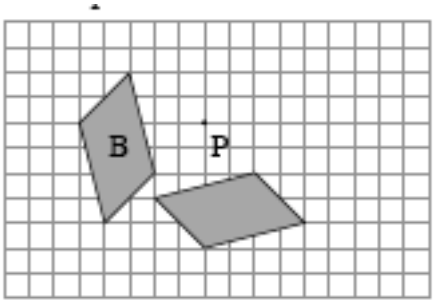
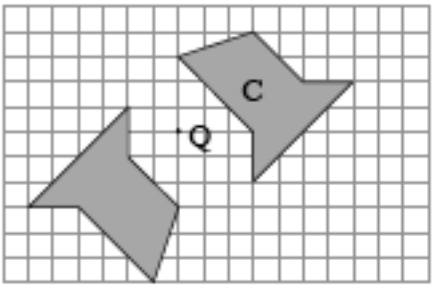
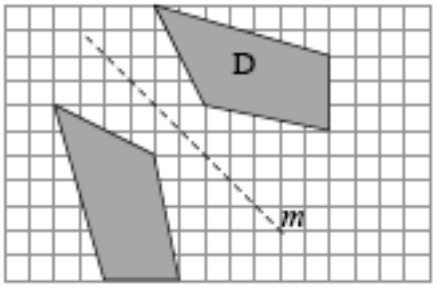


c:



d:



1.3.1:

1-99. Carol: only inside circle #2; Bob: outside both circles; Pedro: only inside circle #1. In order to belong to the intersection of both circles, a person would need to have long hair and study a lot for class.

1-100. **a:** $x=-\frac{9}{33}=-\frac{3}{11}$ **b:** $x=5$ and $x=-\frac{3}{2}$ **c:** $x=1$ **d:** $x=\frac{12}{13}$

1-101. **a:** It looks the same as the original.
b: Solution should be any value of $45k$ where k is an integer.
c: circle

1-102. **a:** $(-6,-3)$ **b:** The vertices are $(6,2)$, $(2,3)$, and $(5,6)$ **c:** $(8,-4)$

1-103. $y=3x+2$

1.3.2:

1-110. rectangle and square

1-111. Answers vary.

1-112. **a:** isosceles triangle **b:** pentagon **c:** parallelogram
d: obtuse scalene triangle **e**: isosceles right triangle **f:** trapezoid

1-113. REFL ONLY: A, B, C, D, E, M, T, U, V, W, Y
ROT. ONLY: N, S, Z
INTERSECTION: H, I, O, X
OUTSIDE BOTH REGIONS: F, G, J, K, L, P, Q, R

1-114. D

1.3.3:

1-121. an isosceles right triangle

1-122. $\frac{1}{535} \approx 0.0019$ No, this probability is very small.

1-123. **a:** $\frac{1}{4}$ **b:** $\frac{3}{4}$ **c:** $\frac{2}{4} = \frac{1}{2}$

1-124. **a:** Yes, it is correct because the two angles make up a 90° angle.
b: $x = 33°$, so one angle is $33 - 10 = 23°$ while the other is $2(33) + 1 = 67°$
c: $23° + 67° = 90°$

1-125. The graph is a parabola with roots (–3, 0) and (1, 0), and *y*-intercept at (0, –3).

Chapter 2

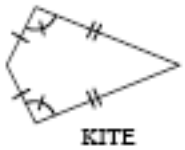
2.1.1:

2-8. **a:** 33 square cm **b:** $33x$ square units **c:** $33x^2 - 50x + 8$ square units

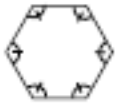
2-9. **a:** $\frac{1}{2}$ **b:** $\frac{1}{6}$

2-10. **a:** isosceles triangle **b:** equilateral triangle **c:** rhombus

2-11.

a. 
KITE

b. 
ISOSCELES TRIANGLE

c. 
REGULAR HEXAGON

d. 
RHOMBUS

2-12. Answers vary. The left circle could be "equilateral", and the right could be "quadrilateral". Assuming this, you could add an equilateral hexagon to the left, a rhombus to the intersection, and a rectangle to the right circle.

2.1.2:

2-18. **a:** Vertical angles, congruent, $3x + 5° = 5x - 57°$, $x = 31°$
b: Straight angle pair, supplementary, $2x + 4x + 150° = 180°$, $x = 5°$

2-19. **a:** $m\measuredangle B = m\measuredangle C$ because the line of symmetry must pass through A (according to the marked sides of equal length) and these angles are on opposite sides of the line of symmetry.
b: Since they are equal, $m\measuredangle B = \frac{1}{2}(124°) = 62°$.

2-20. **a:** square **b:** $(-4,5)$, $(1,5)$, $(-4,0)$, $(1,0)$

2-21. $y = x - 1$; No, because $1 \neq 3 - 1$

2-22. **a:** Vertical; they are equal. **b:** They form a "Z."

2.1.3:

2-29. **a:** $(-2, 3)$ **b:** $(-2, 3)$, yes

2-30. **a:** 20 square units
b: 2,600 square units; subtract the x and y-coordinates to find the length of the two sides.

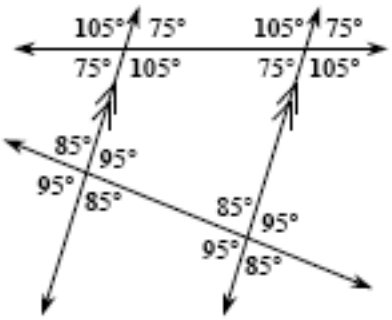
2-31. **a:** We do not know the angles are equal, because we do not know if $\overleftrightarrow{BD} \| \overleftrightarrow{EG}$.
b: The diagram does not have parallel line marks.

2-32. **a:** $x = 17.5$ (corresponding angles)
b: $x = 5$ (multiple relationships can be used)

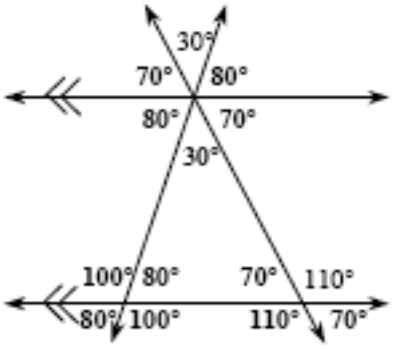
2-33. **a:** an isosceles triangle **b:** a rectangle

2.1.4:

2-38. **a:**



b:



2-39. The slopes are $\frac{2}{3}$ and $-\frac{3}{2}$. Since the slopes are opposite reciprocals, the lines must be perpendicular.

2-40. $(3, -1)$, $(7, -1)$

2-41. They used different units.

2-42. The lines are parallel, so they do not intersect. Therefore, there is no solution.

2.1.5:

2-51. $x = 7°$

2-52. **a:** $x = 10$ units **b:** $x = 6$ **c:** $x = 20°$ **d:** $x = 10°$

2-53. **a:** $x = 4$ and $y = 18$ **b:** $x = -13$ and $y = 6$

2-54. **a:** Should be triangle with horiz. base of length 4 and vertical base of length 3
b: $-\frac{4}{3}$ **c:** Any equation of the form $y = -\frac{3}{4}x + b$

2-55. 2

2.2.1:

2-61. They are all isosceles triangles.

2-62. Reasoning will vary. $a = 118°$, $b = 118°$, $c = 32°$, $d = 32°$

2-63. **a:** $15°$ **b:** $x = 12°$, $m\measuredangle D = 4(12°) + 2° = 50°$ **c:** It is equilateral.

2-64. $A'(-6,-3)$, $B'(-2,-1)$, and $C'(-5,-7)$

2-65. **a:** $y = -\frac{2}{3}x + 3$ **b:** Yes, because the slopes are opposite reciprocals.
c: $y = \frac{1}{2}x + 5$ **d:** Any equation of the form $y = -2x + b$ for all real b values.

2.2.2:

2-70. **a:** $8x^2 - 26x - 7$ **b:** $10x^2 + 31x - 14$
c: $4x^2 - 47x + 33$ **d:** $-6x^2 + 17x - 5$

2-71. area = 28 square units

2-72. **a:** $x = 8°$, right angle is $90°$
b: $x = 20°$, straight angle is $180°$
c: $x = 20°$, sum of angles in a triangle is $180°$
d: $x = 60°$, sum of angles in a triangle is $180°$

2-73. Daniel is correct because the definition of a rectangle is a quadrilateral with four right angles. Since a square has four sides and four right angles, it must be a rectangle.

2-74. **a:** $\frac{4}{52} = \frac{1}{13}$ **b:** $\frac{13}{52} = \frac{1}{4}$ **c:** $\frac{1}{52}$ **d:** $\frac{39}{52} = \frac{3}{4}$

2.2.3:

2-81. **a:** $y = -\frac{6}{5}x + 4$ **b:** $y = \frac{1}{2}x - 2$

2-82. The unshaded triangle is half the area of the rectangle $\left(.5(8)(17) = 68 \text{ sq. in.}\right)$, so the shaded area is the other half.

2-83. **a:** Because when you are not standing up straight, you have changed your height, and you will not get a true measure of your height.
b: Diagram (1) is correct.

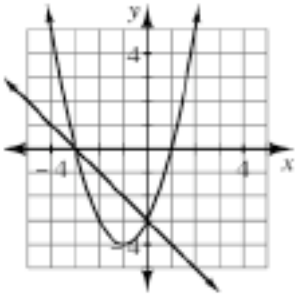
2-84. **a:** If it rains, then Mr. Spelling is unhappy.
b: If you add two even numbers together, then the result is even.
c: If it is Tuesday, then Marla has a piano lesson.

2.2.4:

2-90. **a:** $7^2 = 49$ sq. cm **b:** $0.5(10)(4) = 20$ sq. in.
c: $0.5(16 + 8)(6) = 72$ sq. ft.

2-91. **a:** $15x^2 + 21x$ **b:** $x^2 + 5x + 6$
c: $3x^2 - x - 10$ **d:** $10x^2 - 3x - 4$

2-92. See graph; (–3, 0) and (0, –3)



2-93. **a:** Isosceles Trapezoid because two sides are parallel and the other two sides are the same length.
b: $A'(7,-2)$, $B'(8,-4)$, $C'(2,-4)$, $D'(3,-2)$
c: 10 square units

2-94. **a:** $\frac{12}{52} = \frac{3}{13}$ **b:** $\frac{20}{52} = \frac{5}{13}$ **c:** $\frac{2}{52} = \frac{1}{26}$ **d:** 0

2.3.1:

2-100. **a:** $\sqrt{68} \approx 8.2$, since $\sqrt{64} = 8$, then $\sqrt{68}$ must be a little higher.
b: (1) 2.2, (2) 9.2, (3) 7.1, (4) 4.7

2-101. 17 units

2-102. **a:** $6x + 6$ **b:** $6x + 6 = 78$, so $x = 12$ and the rectangle is 15 cm by 24 cm.
c: $(2 \cdot 12)(12 + 3) = 360$

2-103. **a:** If a polygon is a parallelogram, then its area equals its base times its height.
b: "If a polygon is a triangle, then its area equals one half its base times its height." Arrow diagram: *Polygon is a triangle → area of the polygon equals one-half base times height.*

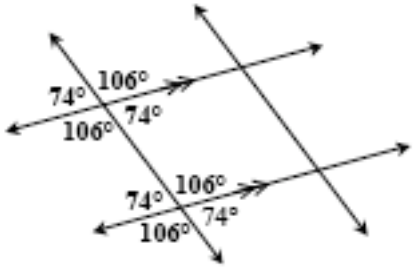
2-104. No, it would take 10 months for Sarita to catch up to Berti.

2.3.2:

2-109. 10 units

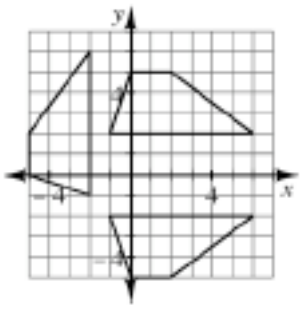
2-110. $y = \frac{6}{5}x - 3$ **b:** $y = -\frac{1}{4}x + 4.5$ **c:** $y = \frac{1}{3}x$ **d:** $y = 2$

2-111.



2-112. **a:** 1 **b:** $\frac{3}{8}$ **c:** $\frac{5}{8}$

2-113. **a:** It is a trapezoid because it has two parallel sides.
b: $A'(-2,-1)$, $B'(-5,0)$, $C'(-5,2)$, $D'(-2,6)$
c: $A'''(1,2)$, $B'''(-2,5)$
d: $\frac{1}{2}(3)(2 + 7) = 13.5$ units



2.3.3:

2-118. **a:** (1) $(5,3)$; (2) $(2,-6)$

b: $p: y = 2x + 8$; $q: y = -\frac{1}{2}x + 3$

c: The solution should be $(-2,4)$.

2-119. **a:** right triangle; slopes are opposite reciprocals

b: 20 square units

c: ≈ 23.4 units

2-120. height = 12 units, area = $\frac{1}{2}(12)(12 + 23) = 210$ square units

2-121. **a:** $x = 28.5°$, Triangle Angle Sum Theorem

b: $x = 23°$, relationships used varies

c: $x = 68°$, corresponding angles are equal because the lines are parallel and base angles of an isosceles triangle are equal.

2-122. 5° and 21°

Chapter 3

3.1.1:

3-5. **a:** The enlarged rectangle will be 6 units by 8 units.
b: $A = 48$ sq. un., $P = 28$ un.
c: 5 units

3-6. **a:** $x = 18$ **b:** $x = 3$ **c:** $x = 6$ **d:** $x = 2$

3-7. **a:** $\approx 30°$, $\approx 40°$, $\approx 110°$
b: Obtuse scalene triangle

3-8. **a:** $\frac{4}{5}$ **b:** $MU = \sqrt{41} \approx 6.40$ units
c: Δx and Δy are used for both, but are used differently: one is a ratio (slope) while the other is a length (distance).

3-9. **a:** If a shape is an equilateral triangle, then it has 120° rotation symmetry.
b: If a shape is a rectangle, then the shape is a parallelogram.
c: If a shape is a trapezoid, then the shape's area is half the sum of its bases multiplied by its height.

3.1.2:

3-17. Result should be 12 units tall and 16 units wide.

3-18. **a:** The 15 corresponds to the 6, while the 20 corresponds to the 8. Multiple equivalent ratios are possible. One possibility: $\frac{15}{6} = \frac{20}{8} = 2.5$
b: 25 and 10; $\frac{25}{10} = 2.5$; yes

3-19. If h represents the number of hours and t represents the temperature, then $t = 77 + 3h$ and $t = 92 - 2h$; $h = 3$ hours and the temperature will be 86°F.

3-20. $x = 10°,\ y = 61°$

3-21. No, this is not convincing. While the facts are each correct, the conclusion is not based on the facts. As stated in Fact #2, a square is a rectangle because it has four right angles. However, a rhombus does not have to have four right angles, so therefore there is not enough evidence that a rhombus is a rectangle.

3.1.3:

3-27. **a:** Zoom factor: 0.5; The sides are only half as long, so the side corresponding to the 16 must become 8, and the side corresponding to the 11 must become 5.5.
b: It is 1:1 because it is congruent.

3-28. P(original) = 18 units and P(new) = 36 units; A(original) = 18 sq. units and A(new) = 72 sq. units. The enlarged perimeter is 2 times greater. The enlarged area is not 2 times greater. The enlarged area is 4 times greater.

3-29. **a:** $x = \frac{42}{5} = 8.4$ **b:** $m = 22$ **c:** $t = 12.5$ **d:** $x = \frac{3}{2} = 1.5$

3-30. **a:** $y = 3 - \frac{3}{5}x$ **b:** $A = 7.5$ sq. units, $P = 8 + \sqrt{34} \approx 13.8$
c: $y = 3 + \frac{5}{3}x$

3-31. **a:** alt. int. angles **b:** vertical angles
c: corresponding angles **d:** straight angle (or supplementary)

3.1.4:

3-38. **a:** $f = 9$ **b:** $g = 18$ **c:** $h = \frac{70}{3}$

3-39. **a:** $180° - 38° - 63° = 79°$ and $180° - 38° - 79° = 63°$, corresponding angles are equal.
b: All unmarked angles are the same since the difference with 180° will be the same.

3-40. **a:** Sandy's probability $= \frac{2}{4}$, while Robert's is $\frac{3}{5}$. Therefore, Robert has a greater chance.

3-41. They will be 3 years old.

3-42. **a:** The coordinates of the image are $A(-6,-4)$, $B(10,-4)$, $C(10,6)$, $D(2,12)$, and $E(-6,6)$.
b: perimeters = 28 and 56 un; areas = 52 and 208 sq. units

3.2.1:

3-48. **a:** Yes, since all trees are green and the oak is a tree.
b: No, only trees must be green according to the statement.
c: No, the second statement reverses the first.

3-49. **a:** yes, AA ~ **b:** yes, AA ~ or SSS ~ **c:** yes, zoom factor of 2.5 so SSS ~
d: no, since corresponding angles are not equal. Note that you can't apply zoom factor to angles.

3-50. **a:** If lines are parallel, then alternate interior angles are equal.
b: "If lines are parallel, then corresponding angles are equal" and "Lines are parallel → corresponding angles are equal."

3-51. Perimeter = 44.9 units; Area = 94 square units

3-52. **a:** $ABCD \sim EVOL$ **b:** $RIGHT \sim RONGW$
c: one possible answer: $\Delta TAC \sim \Delta GDO$

3.2.2:

3-59. **a:** $x = 20$ **b:** $w = 91$

3-60. Only (b) is possible. (a) can be rejected using Triangle Inequality or the Pythagorean Theorem, and (c) is rejected because the sum of the angles is 179°.

3-61. **a:** reflection, rotation, and translation (students may not include translation, since it can be avoided with a specially-chosen point of rotation)
b: rotation and translation
c: rotation, dilated by zoom factor of 2 and translation
d: rotation, reflection, and reduced by zoom factor of 0.5 (Students may also write translation, or multiple reflections instead of rotation and reflection.)

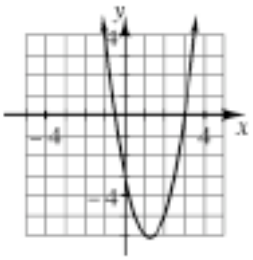
3-62. This reasoning is incorrect. The statement "it is raining" should be placed in the lower left oval, and "Andrea's flowers must be closed up" in the right oval.

3-63. **a:** possible
b: not possible because the sum of the measures of an obtuse and right angle is more than 180°
c: not possible because a triangle with sides of equal length obviously cannot have sides of different lengths
d: possible

3.2.3:

3-68. **a:** $(-\frac{1}{2},0)$ and $(3,0)$

b: $x=-\frac{1}{2}$ or $x=3$, yes



3-69. **a:** $(5,-2)$ **b:** $(-4,2)$ **c:** $(4,3)$

3-70. **a:** $x=51°$ **b:** $x=43°$ **c:** $x=1$

3-71. **a:** $n=32$ **b:** $m\approx 14.91$

3-72. Missing side length of first rectangle must be 4 un because the perimeter is 26 un. Missing side length of second rectangle must be 9 un because the area is 36 sq.un. Since angles are equal and ratios of corresponding side lengths are equal, therefore, the rectangles are similar. In fact, they are congruent because $r=1$.

3.2.4:

3-78. **a:** scalene triangle **b:** isosceles triangle
c: not possible **d:** equilateral triangle

3-79. **a:** The two equations should have the same slope but a different y-intercept. This forces the lines to be parallel and not intersect.
b: When solving a system of equations that has no solution, the equations combine to create an impossible equality, such as 3 = 0.

3-80. **a:** not similar, interior angles are all different
b: must be similar, zoom factor 1.5
c: not similar, interior angles are all different

3-81. perimeter $=10+10+4+3+4+3+4=38$ units, height of triangle 8 units, area = 60 square units

3-82. **a:** $3(4x-12)=180°$, $x=18$
b: $4.9^2-3.1^2=x^2$, $x\approx 3.79$
c: $x+(180°-51°-103°)+82°=180°$, $x=72°$
d: $3x-2=2x+9$, $x=11$

3.2.5:

3-88. **a:** not possible because all three angles are 60° and therefore acute angles
b: possible
c: possible
d: not possible since a right triangle has a 90° angle and so not all of the angles are acute

3-89. **a:** SSS ~ and SAS ~ (if students show that the triangles are right triangles)
b: AA ~ and SAS ~
c: None since there is not enough information.

3-90. **a:** ≈ 2.344 **b:** ≈ 0.667 **c:** 1.5 or -5 **d:** no solution

3-91. Original: A = 135 sq. un., P = 48 un.; New: A = 15 sq. un., P = 16 un.

3-92. ≈ 13.2 miles

3.2.6:

3-96. $x = 137°,\ y = 76°$

3.97. $h = 5$ units, perimeter ≈ 24.2 units

3-98. **a:** $-\frac{1}{4}$ **b:** $-\frac{1}{4}$ **c:** $-\frac{1}{4}$

3-99. $x = 8.4,\ y = 7.5,\ z = 9.6$

3-100. $(x+2)(x+5) = 40,\ x^2 + 7x - 30 = 0$ so $x = -10$ or 3. Since x cannot be negative, $x = 3$. Therefore, the dimensions of the rectangle are 5 and 8 units.

Chapter 4

4.1.1:

4-6. **a:** $x = 11°$ **b:** $x = 45°$ **c:** $x = 30°$ **d:** $x = 68°$

4-7. **a:**

b: Yes, because the triangles are similar (AA ~) and the ratio of the corresponding side lengths is 1 (because $AC = DF$).

4-8. **a:** Yes, she used the Pythagorean Theorem.
b: $(x+1)^2 = x^2 + 2x + 1$ **c:** $x = 24$ **d:** 56 units

4-9. $x = 9,\ y = 4,\ z = 6\frac{2}{3}$

4-10. Yes they are parallel because they have the same slope: $-\frac{3}{5}$.

4.1.2:

4-16. **a:** $\theta = 11°,\ \frac{x}{95} \approx \frac{1}{5},\ x \approx 18.46$ **b:** $a = b = 45°$ **c:** $\frac{y}{70} \approx \frac{5}{2},\ y \approx 175$

4-17. **a:** side ratio = 4:1 **b:** perimeter ratio is 4:1 **c:** 28□

4-18. **a:** yes, AA ~ **b:** no, side ratios not equal $\frac{12}{64} \neq \frac{18}{98}$
c: cannot tell, not enough angle values given

4-19. $y = \frac{1}{3}x + 9$

4-20. Since the slope ratio for $11° \approx 0.2$, $AB \approx 50$ units. The slope ratio for $68° \approx 2.5$, so $BC \approx 4$ units. Thus, AB is actually longer.

4.1.3:

4-25. They both could be. It depends on which angle is used as the slope angle.

4-26. **a:** Yes, since the slope ratio is greater than 1, the angle must be greater than 45°.
b: Isiah is correct. Since the angle is less than 45°, the slope ratio must be less than 1.
c: Since the angle is greater than 45°, x must be less than 9.

4-27. **b:** ratio for $11° \approx \frac{1}{5}$, so $\frac{170}{x} \approx \frac{1}{5}$, and $x \approx 850$ feet.

4-28. Answers vary, possible solution: square, equilateral triangle, and equilateral hexagon.

4-29. $m\measuredangle ABC = 22°$, $m\measuredangle BAC = 68°$, sum = 90°; complementary

4.1.4:

4-36. **a:** $t = 780.178$ **b:** $p \approx 3.215$ **c:** $b \approx 148.505$

4-37. **a:** 24
b: $2x + 20° + 3x + 20° + x + 2x = 360°$, $x = 40°$
c: $\frac{5}{12} = \frac{3}{x}$, $x = \frac{36}{5} = 7.2$

4-38. They are congruent. They are similar (SSS ~) and the ratio is 1.

4-39. **a:** It implies that because Brian is always late on Tuesday, then today must be Tuesday.
b: The "Brian is always late on Tuesdays" and "Today is Tuesday" ovals should be next to each other, both with arrows pointing to "Brian will be late today."

4-40. Her father's eyes were ≈ 69.126 inches high.

4.1.5:

4-43. **a:** either 3 or $\frac{1}{3}$ **b:** either 9 or $\frac{1}{9}$

4-44. **a:** $3x + 3° + x + 7° = 90°$, $x = 20°$ **b:** $9x + 4° = 3x + 14°$, $x = \frac{10}{6} \approx 1.67°$

4-45. tuna & ice cream, or tuna & cookies; turkey & brownies, turkey & ice cream, or turkey & cookies; lasagna & brownies, lasagna & ice cream, or lasagna & cookies.

4-46. ≈ 29.44 feet

4-47. $10^2 + (x + 3)^2 = 26^2$, $x = 21$

4.2.1:

4-54. **a:** 12 boys **b:** 22 girls **c:** $\frac{2}{3}$ **d:** 7 boys left, 23 students, so $\frac{7}{23}$

4-55. It assumes that everyone who likes bananas is a monkey.

4-56. **a:** $x = 13$, Pythagorean Theorem
b: $x = 80°$, alternate interior angles and the Triangle Angle Sum Conjecture

4-57. ≈ 1469.27 feet

4-58. **a:** 10 combinations: (a, b, c), (a, b, d), (a, b, e), (a, c, d), (a, c, e), (a, d, e), (b, c, d), (b, c, e), (b, d, e), (c, d, e)
b: For every 2 songs that are played, there are automatically 3 songs that are not. Therefore, this problem just switched the list of played and unplayed songs.

4.2.2:

4-63. $6 < x < 14$

4-64. 24 possible ways: ABCD, ABDC, ACBD, ACDB, ADBC, ADCB, BACD, BADC, BCAD, BCDA, BDAC, BDCA, CABD, CADB, CBAD, CBDA, CDAB, CDBA, DABC, DACB, DBAC, DBCA, DCAB, DCBA

4-65. **a:** yes, $\Delta ABD \sim \Delta EBC$ by AA~
b: yes. Since $DB = 9$ units (by the Pythagorean Thm), the common ratio is 1.

4-66. $LE = MS$ and $LI = ES = MI$

4-67. $AB \approx 11.47$ un., $A \approx 97.47$ square units

4.2.3:

4-72. **a:** slope $= \frac{1}{2}$
b: It must be parallel to or coincide with the line on the graph.

4-73. 12 seconds

4-74. No. Triangle Inequality property prevents this because $7 + 10 < 20$ and $20 - 10 > 7$.

4-75. **a:** $x = 49$ **b:** $x = 2$ **c:** $x = \frac{16}{3}$ **d:** $x = -5$ or 1

4-76. leg ≈ 29.44 units, hypotenuse ≈ 30.78 units, so the perimeter ≈ 69.22 units

4.2.4:

4-82. **a:** 20 **b:** $\frac{8}{20} = \frac{2}{5}$

4-83. Yes, they are similar due to AA ~ because $m\measuredangle B = m\measuredangle E$ and $m\measuredangle C = m\measuredangle C$ (triangles share an angle).

4-84. $\frac{1}{6}$, If the die is "fair," each roll of the die is an independent event.

4-85. Methods vary: $\theta = 68°$ (could be found using corresponding and supplementary angles), $\alpha = 85°$ (could be found using corresponding angles since lines are parallel.

4-86. $x \approx 10.39,\ y = 12$

4.2.5:

4-91. **a:** less than 45° **b:** equal to 45° **c:** more than 45°

4-92. $\sqrt{6^2 - 3^2} = \sqrt{27}$, $\sqrt{9^2 - 3^2} = \sqrt{72}$. So perimeter is $\sqrt{27} + \sqrt{72} + 15 = 28.68$ units. The area is $\left(\sqrt{27} + \sqrt{72}\right)(3) + 2 = 20.52$ sq. units.

4-93. 540°

4-94. The slope is $-\frac{7}{10}$. Points will vary. A few possible solutions: $(5, 79)$, $(15, 72)$, $(25, 65)$, etc.

4-95. **a:** $A'(-3,-3)$, $B'(9,-3)$, $C'(-3,-6)$ **b:** $A''(-3,3)$, $B''(-3,-9)$, $C''(-6,3)$
c: $(9,3)$