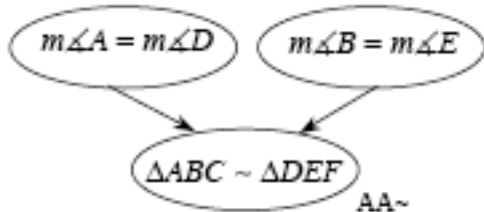


## Chapter 4

### 4.1.1:

4-6. a:  $x = 11^\circ$       b:  $x = 45^\circ$       c:  $x = 30^\circ$       d:  $x = 68^\circ$

4-7. a:



b: Yes, because the triangles are similar ( $AA \sim$ ) 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:  $\theta = 11^\circ, \frac{x}{95} \approx \frac{1}{5}, x \approx 18.46$       b:  $a = b = 45^\circ$       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:  $28\square$

4-18. a: yes,  $AA \sim$       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  $11^\circ \approx 0.2$ ,  $AB \approx 50$  units. The slope ratio for  $68^\circ \approx 2.5$ , 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  $45^\circ$ .  
**b:** Isiah is correct. Since the angle is less than  $45^\circ$ , the slope ratio must be less than 1.  
**c:** Since the angle is greater than  $45^\circ$ ,  $x$  must be less than 9.
- 4-27. **b:** ratio for  $11^\circ \approx \frac{1}{5}$ , 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.  $m\angle ABC = 22^\circ$ ,  $m\angle BAC = 68^\circ$ , sum =  $90^\circ$ ; 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:**  $2x + 20^\circ + 3x + 20^\circ + x + 2x = 360^\circ$ ,  $x = 40^\circ$   
**c:**  $\frac{5}{12} = \frac{3}{x}$ ,  $x = \frac{36}{5} = 7.2$
- 4-38. They are congruent. They are similar (SSS  $\sim$ ) 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  $\approx 69.126$  inches high.

### 4.1.5:

- 4-43. **a:** either 3 or  $\frac{1}{3}$                       **b:** either 9 or  $\frac{1}{9}$
- 4-44. **a:**  $3x + 3^\circ + x + 7^\circ = 90^\circ$ ,  $x = 20^\circ$     **b:**  $9x + 4^\circ = 3x + 14^\circ$ ,  $x = \frac{10}{6} \approx 1.67^\circ$
- 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.  $\approx 29.44$  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:**  $x = 80^\circ$ , alternate interior angles and the Triangle Angle Sum Conjecture

4-57.  $\approx 1469.27$  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,  $\triangle ABD \sim \triangle EBC$  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  $\approx 29.44$  units, hypotenuse  $\approx 30.78$  units, so the perimeter  $\approx 69.22$  units

#### 4.2.4:

4-82. a: 20

b:  $\frac{8}{20} = \frac{2}{5}$

4-83. Yes, they are similar due to AA  $\sim$  because  $m\angle B = m\angle E$  and  $m\angle C = m\angle C$  (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:  $\theta = 68^\circ$  (could be found using corresponding and supplementary angles),  $\alpha = 85^\circ$  (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  $45^\circ$

b: equal to  $45^\circ$

c: more than  $45^\circ$

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  $(\sqrt{27} + \sqrt{72})(3) + 2 = 20.52$  sq. units.

4-93.  $540^\circ$

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:  $(9, 3)$