

**Chapter 1**

1. Solve the equations below for  $x$ , if possible. Be sure to check your solution(s).

a.  $\frac{3x-1}{4} = -\frac{5}{11}$

b.  $(5-3x)(4x+3) = 0$

c.  $6 - 5(2x - 3) = 4x + 7$

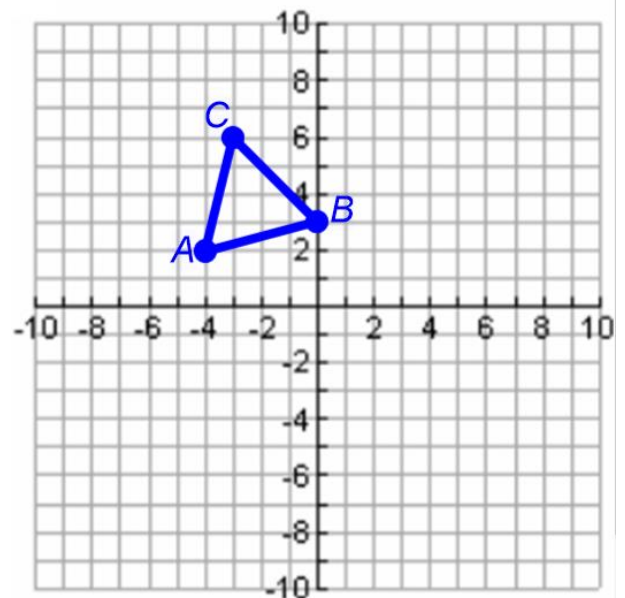
d.  $\frac{3x}{4} + 2 = 4x - 1$

2.

a. Rotate  $\triangle ABC$   $90^\circ$  counter-clockwise (  $\curvearrowright$  ) about the origin to create  $\triangle A'B'C'$ . Name the coordinates of  $C'$ .

b. Reflect  $\triangle ABC$  across the vertical line  $x=1$  to create  $\triangle A''B''C''$ . Name the coordinates of the vertices.

c. Translate  $\triangle ABC$  so that  $A'''$  is at  $(4, -5)$ . Name the coordinates of  $B'''$ .



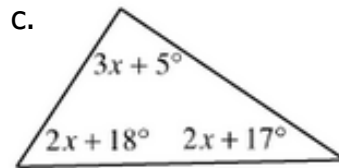
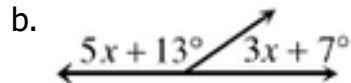
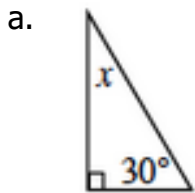
## Chapter 2

3. Solve each system of equations below. Then verify that your solution makes each equation true.

a.  $y = 5 - x$   
 $4x + 2y = 10$

b.  $3x + 2y = 12$   
 $5x - 3y = -37$

4. For each diagram below, solve for  $x$ . Give the angle pair name and the relationship to justify your equation.



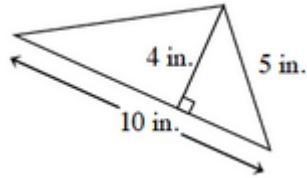
5. Berti is the Shape Factory's top employee. She has received awards every month for having the top sales figures so far for the year. If she stays on top, she will receive a \$5000 bonus for excellence. She currently has sold 16,250 shapes and continues to sell 340 per month. Since there are eight months left in the sales year, Sarita is working hard to catch up. While she has only sold 8,830 shapes, she is working overtime and on weekends so that she can sell 1,082 per month. Will Sarita catch up with Berti before the end of the sales year? If so, when?

6. Find the area of each figure below. Show all work. Remember to include units in your answer.

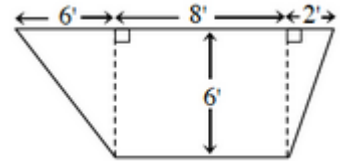
a. a square



b.



c.

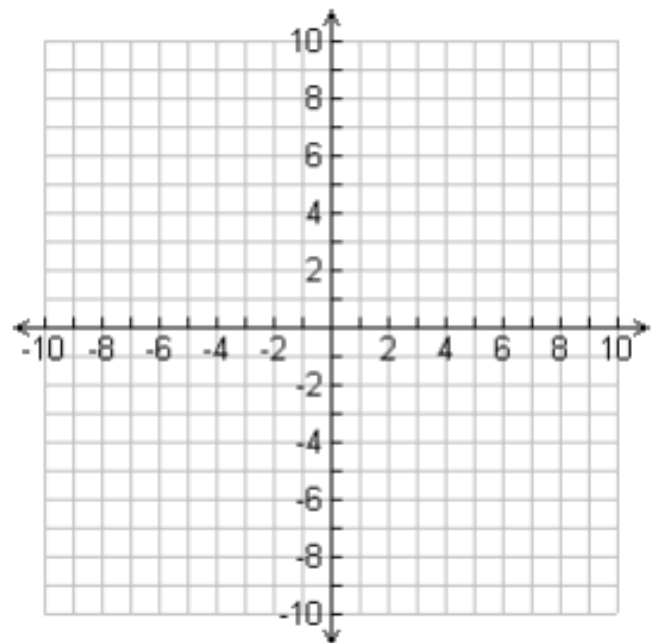


7. Plot quadrilateral  $ABCD$ .  $A(2, 7)$ ,  $B(4, 8)$ ,  $C(4, 2)$ , and  $D(2, 3)$ .

a. What is the best name for this shape? Justify your conclusion.

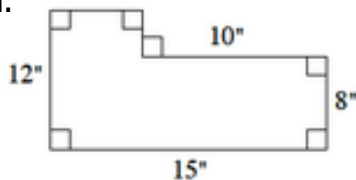
b. Quadrilateral  $A'B'C'D'$  is formed by rotating  $ABCD$   $90^\circ$  clockwise about the origin. Name the Coordinates of the vertices.

c. Find the area of  $ABCD$ . Show all work.

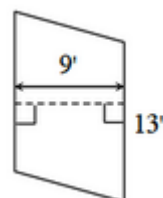


8. Find the area of each figure.

a.

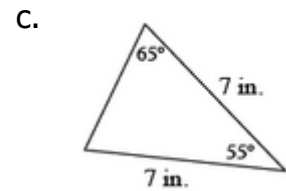
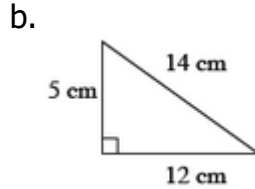
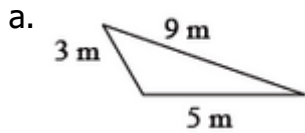


b. parallelogram



### Chapter 3

9. Examine each diagram below. Identify the error in each diagram.



10. Rewrite the statements below into conditional ("If ..., then ...") form.

a. Lines with the same slope are parallel.

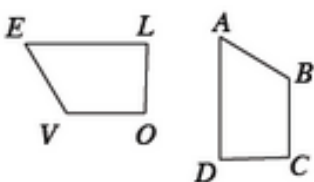
b. A vertical line has undefined slope.

c. The lines with slopes  $\frac{2}{3}$  and  $-\frac{3}{2}$  are perpendicular.

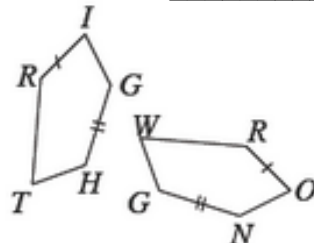
11. Misty is building a triangular planting bed. Two sides have lengths of 26 feet and 37 feet. What are the possible lengths for the third side? Hint: Give your answer as a range of values

12. Assume that each pair of figures below is similar. Write a similarity statement to illustrate which parts of each shape correspond. Remember: letter order is important!

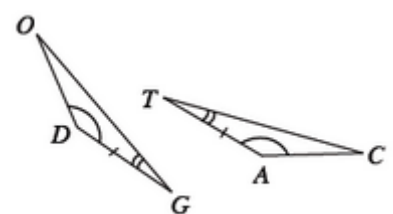
a.  $ABCD \sim$  \_\_\_\_\_?



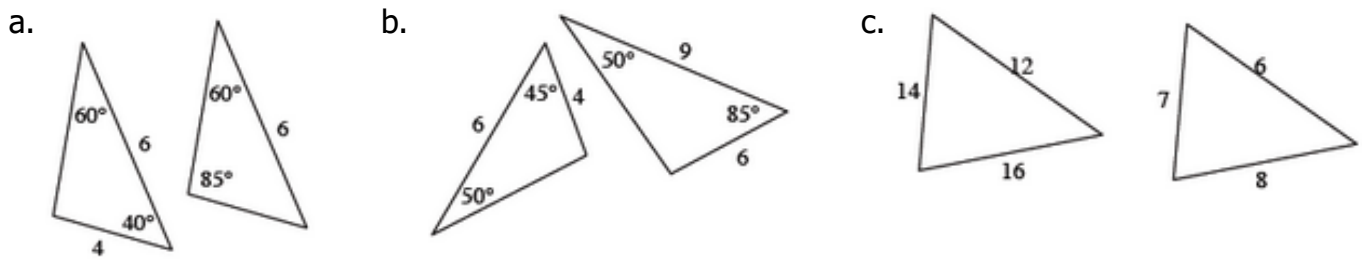
b.  $RIGHT \sim$  \_\_\_\_\_?



c.  $\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_?



**13.** Determine which of the following pairs of triangles are similar. Explain your work.



**14.** For the points  $R(-2, 7)$  and  $P(2, 1)$  determine each of the following:

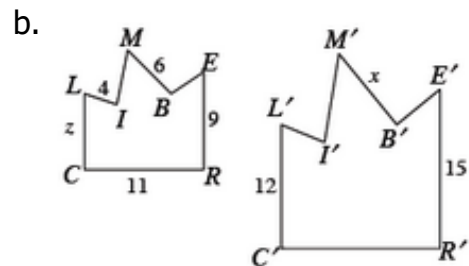
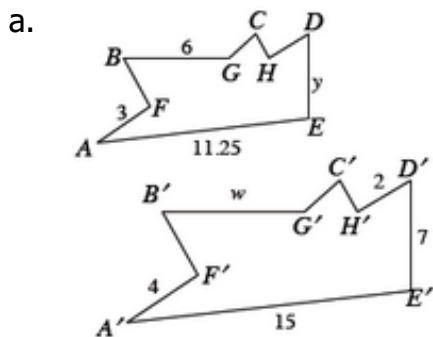
a. The slope of the line through the points.

b. The distance between the points.

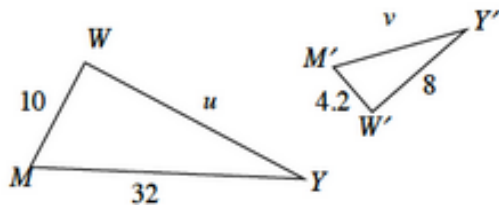
c. An equation of the line  $\overleftrightarrow{RP}$ .

d. An equation of the line perpendicular to line  $\overleftrightarrow{RP}$  and passing through point  $P$ .

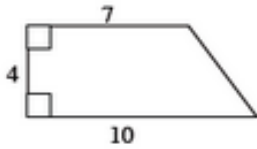
**15.** Each pair of figures below is similar. Find the lengths of the unknown sides that are marked with a variable.



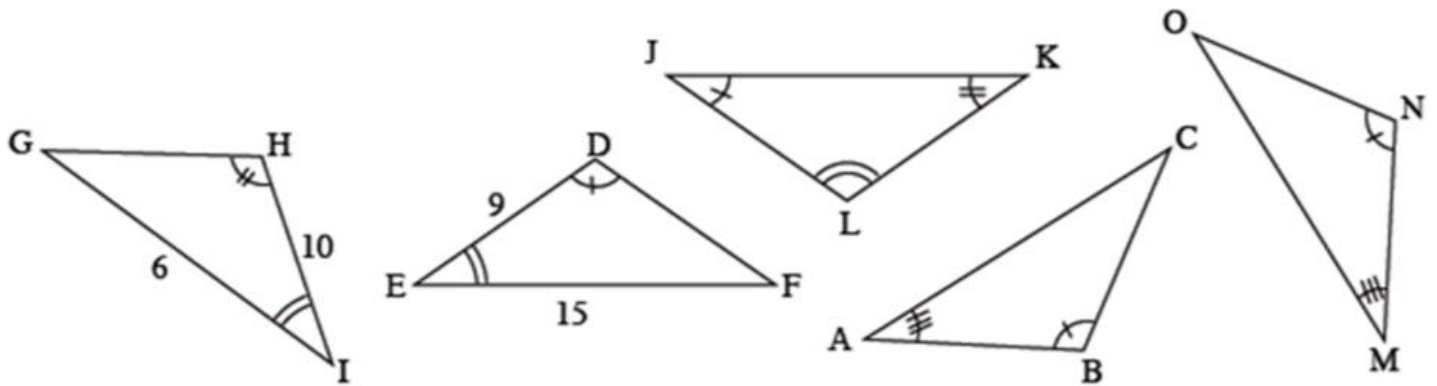
C. .



16. Find the area and perimeter of the following figure.



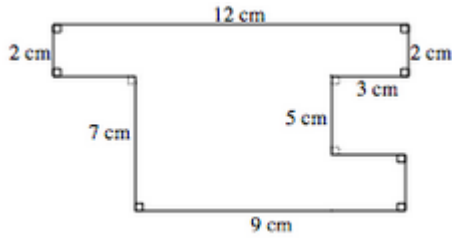
17. Among the triangles below are pairs of similar triangles. Find the pairs of similar triangles and state the triangle similarity condition that you used to determine that the triangles are similar.



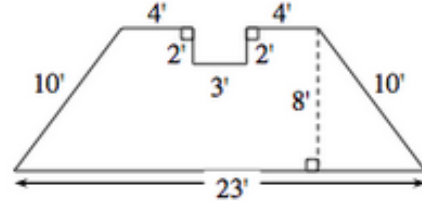
## Chapter 4

18. For each figure below, find the area and the perimeter.

a.



b.

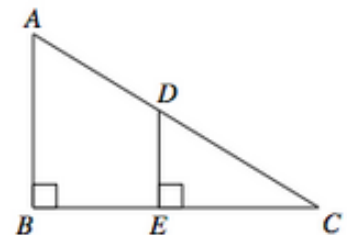


19. Leon is standing 60 feet from a telephone pole. As he looks up, a red-tailed hawk lands on the top of the pole. Leon's angle of sight up to the bird is  $22^\circ$  and his eyes are 5.2 feet above the ground.

a. Draw a detailed picture of this situation. Label it with all of the given information.

b. How tall is the pole? Show all of your work. Round your final answer to the nearest hundredth.

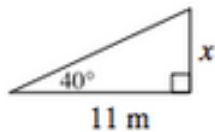
20. Are the triangles at right similar? If so, write a flowchart that justifies your conclusion. If not, explain how you know.



**21.** Eddie told Alfred, "I'll bet if I flip three coins I can get exactly two heads." Alfred replied, "I'll bet I can get exactly two heads if I flip four coins!" Eddie scoffed, "Well, so what? That's easier." Alfred argued, "No, it's not. It's harder." Who is correct? Show all of your work and be prepared to defend your conclusion.

**22.** Solve for the missing side length or angle below. Round your final answers to the nearest hundredth.

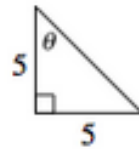
a.



b.



c.

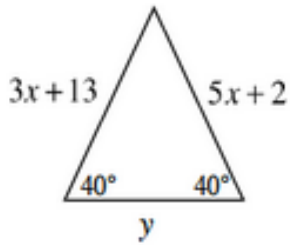


**23.** Salvador has a hot dog stand 58 meters from the base of the Space Needle in Seattle. He prefers to work in the shade and knows that he can calculate when his hotdog stand will be in the shade if he knows the height of the Space Needle. To measure its height, Salvador stands at the hotdog stand, gets out his clinometer, and measures the angle to the top of the Space Needle to be  $80^\circ$ . Salvador's eyes are 1.5 meters above the ground. Assuming that the ground is level between the hotdog stand and the Space Needle, how tall is the Space Needle? Show all of your work and round your final answer to the nearest hundredth.

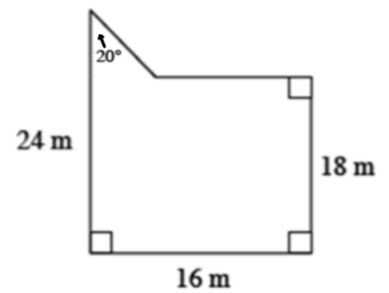


## Chapter 5

24. Use geometric relationships to solve for the given variable(s).

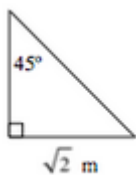


25. Find the area and the perimeter of the figure below. Show all of your work and round your final answer to the nearest hundredth.

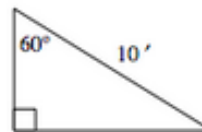


26. For each triangle below, use your triangle shortcuts to find the missing side lengths. Then find the area and perimeter of the triangle. Give your answers in **exact form** (no decimals).

a.

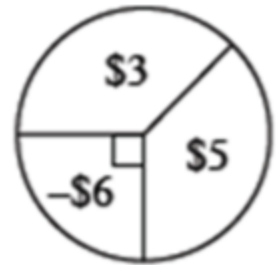


b.

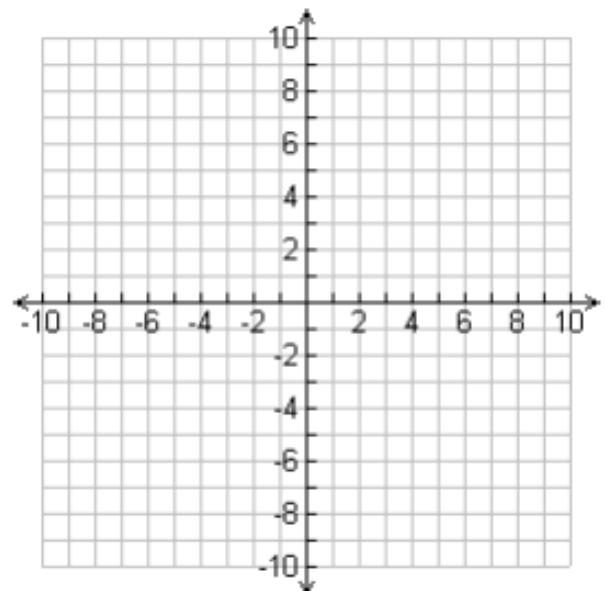


**27.** In a random sample of 10,000 college students, a research company found that 35.7% were involved in a club and 27.8% studied 4 or more hours per day. When they reported their findings, the research company indicated that 53.4% of college students were either involved in a club or they studied 4 or more hours per day. Given this information, what is the probability that a college student is involved in a club and studies 4 or more hours per day?

**28.** The probability of winning \$3 on the spinner at right is equal to the chance of winning \$5. Find the expected value for one spin. Is this game fair? Explain.



**29.** Graph the line  $y = \frac{3}{4}x + 6$ . Then find the slope angle (the acute angle the line makes with the  $x$ -axis).



**30.** In parts (a) and (b) rewrite the expression without parentheses. In parts (c) and (d) solve each equation.

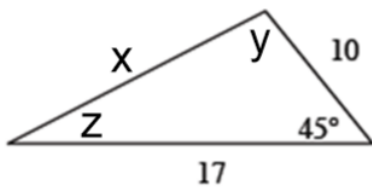
a.  $2x(x+3)$

b.  $(3x+2)(x-3)$

c.  $x^2 - 8x + 7 = 0$

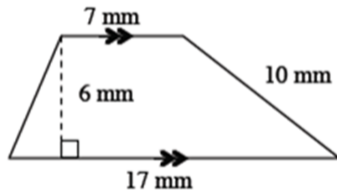
d.  $20y^2 + 9y = 18$

**31.** Solve for the missing side lengths and angles in the triangle below. Show all of your work and round your final answer to the nearest hundredth.

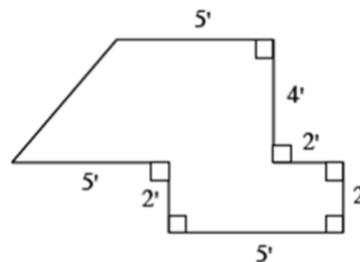


**32.** Find the area and perimeter of each shape below. Show all of your work and round your final answers to the nearest hundredth.

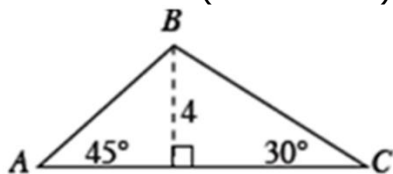
a.



b.



**33.** Find the area and perimeter of  $\triangle ABC$  below. Show all of your work. Give your answers in **exact** form (no decimals).



**34.**

a. Give an equation for the sequence

$$t(n) = 1, 4, 7, 10, \dots$$

b. Give an equation for the sequence

$$t(n) = 3, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}, \dots$$

c. Write an explicit rule for the following arithmetic sequence.

n	t(n)
1	17
2	
3	3
4	

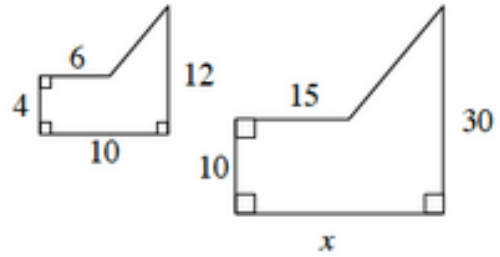
d. Write an explicit rule for the following geometric sequence.

n	t(n)
1	
2	7.2
3	8.64
4	

**Chapter 6**

**35.** The two shapes to the right are similar.

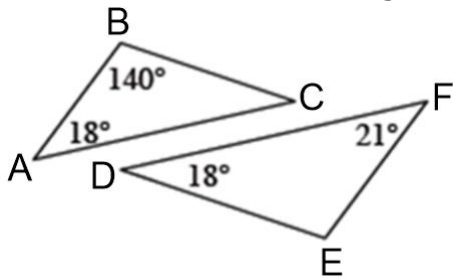
a. Find the value of  $x$ . Show all work.



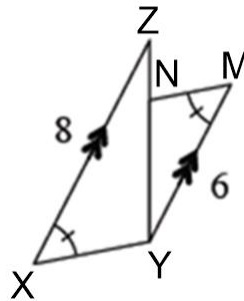
b. Find the area of each shape.

**36.** For each pair of triangles below, decide if the pair is similar, congruent or neither. Justify your conclusion with a flowchart or the reasons why the triangles cannot be similar or congruent. Assume that the diagrams are not drawn to scale.

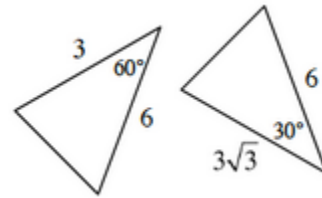
a.



b.



**37.** As Samone looked at the triangles below, she said, "I think these triangles are congruent." Her teammate, Darla, said, "But they don't look the same. How can you tell?" Samone smiled and said, "Never trust the picture! Look at the angles and the sides. The measures are all the same."

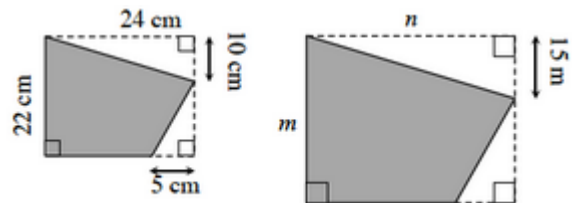


a. Solve for the missing side of each triangle.  
How do they compare?

b. Are you convinced that Samone is correct? Explain.

**38.** The shaded figures to the right are similar.

a. Solve for  $m$  and  $n$ .



b. Find the area and perimeter of each figure.

**39.** Decide if each triangle below is congruent to  $\triangle ABC$  at right, similar but not congruent to  $\triangle ABC$ , or neither. Justify each answer. If you decide that they are congruent, organize your reasoning into a flowchart.

