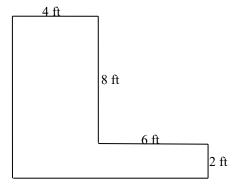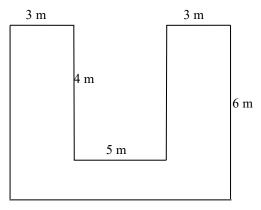# Chapter 2

Exercise Set 2.1

1. What is the area, in square centimeters, of a rectangle whose length is 120 centimeters and whose width is 80 centimeters.

2. What is the area, in square inches, of a circle whose diameter is 9 inches?

3. What is the length, in feet, of a rectangle whose width is 7 feet and whose area is 63 square feet?

4. What is the perimeter, in inches, of a rectangle whose length is 12 feet and whose area is 96 square inches?

5. What is the perimeter of a square whose area is 144 square feet?

6. One angle of a triangle has measure 26 degrees and another has measure 35 degrees. What is the measure, in degrees, of the third angle?

7. (a) What is the perimeter, in centimeters, of a rectangle whose width is 7 centimeters and whose length is 4 centimeters more than its width? **(b)** What is the perimeter, in centimeters, of a rectangle whose width is n centimeters and whose length is 4 centimeters more than its width, in terms of n?

8. (a) What is the area, in square centimeters, of a rectangle whose width is 8 centimeters and whose length is 6 centimeters more than half its width? **(b)** What is the area, in square centimeters, of a rectangle whose width is n centimeters and whose length is 6 centimeters more than half its width, in terms of n?

9. (a) What is the perimeter, in feet, of a rectangle whose width is 6 feet and whose length is 3 feet more than twice its width? **(b)** What is the perimeter, in feet, of a rectangle whose width is n feet and whose length is 3 feet more than twice its width, in terms of n?

10. (a) What is the area, in square feet, of a rectangle whose width is 6 feet and whose length is 2 feet more than three times its width? **(b)** What is the area, in square feet, of a rectangle whose width is n feet and whose length is 2 feet more than three times its width, in terms of n?

11. (a) What is the area of a triangle, in square meters, whose base is 7 meters and whose height is half its base? **(b)** What is the area of a triangle, in square meters, whose base is b meters and whose height is half its base, in terms of b?

12. (a) Janis wants to carpet her living room, which measures 15 feet by 12 feet. She picked out a nice Berber style that cost $2 per square foot. How much will it cost to

carpet her living room? **(b)** If the room is L feet by W feet, write an expression for the cost, C, to carpet the living room in terms of L and W.
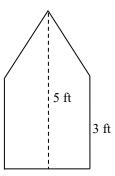
13. (a) A circle is inscribed inside a square of side length 8 centimeters. What is the area, in square centimeters, inside the square and outside the circle? Round your answer to the nearest tenth of a square centimeter. **(b)** A circle is inscribed inside a square of side length s centimeters. What is the area, in square centimeters, inside the square and outside the circle in terms of s?

14. The figure below is a diagram of a floor that needs to be carpeted. **(a)** What is the area, in square feet, of the region that needs to be carpeted? **(b)** What is the length, in feet, of the boundary of this region? **(c)** What is the cost of carpeting this region if the carpet selected costs $2.50 per square foot?
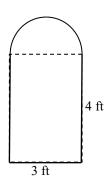

15. The figure below is a diagram of a floor that needs to be tiled. **(a)** What is the area, in square meters, of the region that needs to be tiled? **(b)** What is the length, in meters, of the boundary of this region? **(c)** What is the cost of tiling this region if the tile selected costs $12.00 per square meter?

16. The metal plate shown consists of a square with a triangle on top. How much does the plate weigh, in pounds, if the metal weighs 2.5 pounds per square foot?
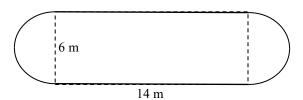
5 ft

3 ft

17. The figure below is a diagram of a window in the shape of a semicircle atop a rectangle of length 3 feet and height 4 feet. **(a)** What is the area, in square feet, enclosed by the window? **(b)** What is the distance, in feet, around the boundary of the window?
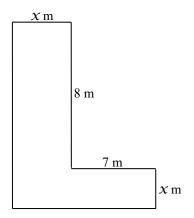
4 ft

3 ft

18. The figure below is a diagram of a garden plot in the shape of a rectangle of length 14 meters long and 6 meters wide with semicircles adjoined on each end.
(a) A landscaping company charges $1.50 per square meter to tend the garden for each month during the summer. How much, in dollars, does the landscaping company charge each month to care for the garden? Round the answer to the nearest cent. **(b)** A fence costing $20 per meter is built around the boundary of the garden. What is the cost, in dollars, of the fencing? Round your answer to the nearest cent.

6 m

14 m

19. (a) Express the area, in square meters, enclosed by figure below in terms of x. **(b)** Express the length, in meters, of the boundary of this figure in terms of x.

x m

8 m

7 m

x m

Exercise Set 2.2

1. Plot the following pairs of points in the coordinate plane and find the distance between them in each case.

a) $(2,3)$, $(7,3)$ b) $(-2,5)$, $(-2,-3)$ c) $(-8,5)$, $(-2,5)$

d) $(-9,1)$, $(6,1)$ e) $(0,-4)$, $(0,2)$ f) $(-5,0)$, $(-1,0)$

g) $\left(\dfrac{2}{5},2\right)$, $\left(\dfrac{8}{3},2\right)$ h) $\left(-\dfrac{2}{3},-1\right)$, $\left(\dfrac{7}{4},-1\right)$ i) $\left(3,\dfrac{5}{6}\right)$, $\left(3,-\dfrac{15}{8}\right)$

2. Sketch the rectangle in the coordinate plane whose vertices are $(-2,5)$, $(3,5)$, $(3,1)$ and $(-2,1)$. Find its area and its perimeter.

3. Sketch the rectangle in the coordinate plane whose vertices are $(-7,-2)$, $(-3,-2)$, $(-3,-5)$ and $(-7,-5)$. Find its area and its perimeter.

4. Sketch the circle in the coordinate plane given that the line segment connecting $(0,2)$ and $(6,2)$ is a diameter of the circle. Find two additional points that lie on the circle. Find the area and the circumference of the circle.
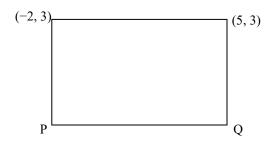
5. Sketch the circle in the coordinate plane given that the line segment connecting $(8,1)$ and $(3,1)$ is a diameter of the circle. Find two additional points that lie on the circle. Find the area and the circumference of the circle.

6. Sketch the triangle in the coordinate plane whose vertices are $(-6,0)$, $(-1,0)$ and $(-3,-4)$. Find its area.
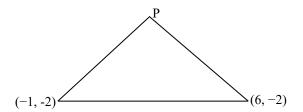
7. Sketch the triangle in the coordinate plane whose vertices are $(5,4)$, $(-2,4)$ and $(-1,2)$. Find its area.

8. Sketch the polygon in the coordinate plane whose vertices are $(-2,5)$, $(4,5)$, $(4,-2)$, $(1,-6)$, $(-2,-2)$ and back to $(-2,5)$, and whose edges are line segments connecting successive pairs of vertices. Find the area enclosed by this polygon.

9. (a) What are the coordinates of the vertices P and Q of the rectangle below if its area is 35? **(b)** What are the coordinates of the vertices P and Q of the rectangle below if its perimeter is 22?
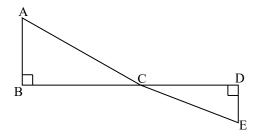
10. What is the y-coordinate of the vertex P of the triangle below if its area is 14?

P
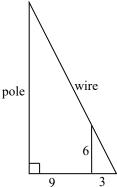
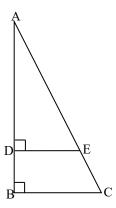(−1, -2)   (6, −2)

Exercise Set 2.3

1. A woman 5 feet tall stands next to her daughter who is 4 feet tall on a sunny day. If the woman's shadow has length 3 feet, what is the length, in feet, of her daughter's shadow?

2. In the figure below, AB has length 6 feet, BC has length 8 feet and CD has length 7 feet. If angles A and D are right angles, what is the length of DE rounded to the nearest tenth of a foot?
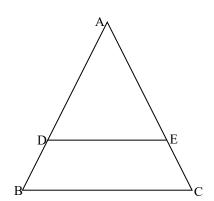

3. If the two sides of a right triangle both have length 5 inches, what is the length, in inches, of the hypotenuse?

4. If the hypotenuse of a right triangle has length 9 centimeters and one of its sides has length 5 centimeters, what is the length of its other side, in centimeters?

5. In the figure below, a wire is stretched from the top of a pole to the ground. A man 6 feet tall stands 9 feet from the base of the pole and 3 feet from where the wire is attached to the ground so that his head touches the wire. What is the height of the pole?
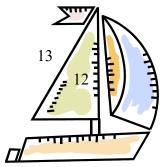
6. In the triangle shown below, AD has length 7 inches, AB has length 9 inches and DE has length 4 inches. If angles B and D are right angles, what is the area of triangle ABC rounded to the nearest tenth of a square inch?
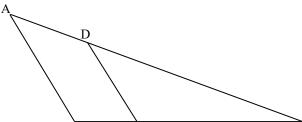

7. Two cyclists leave an intersection together. One goes north at 15 feet per second and the other goes east at 9 feet per second. How far apart are the two cyclists after one minute? Round your answer to the nearest foot.

8. An equilateral triangle has side length 10 centimeters. Find its area in square centimeters. *Hint*: The altitude of an equilateral triangle is the perpendicular bisector of its base.

9. A plywood surface is in the shape of an isosceles triangle with two sides of length 9 feet and base of length 6 feet. How much will this plywood surface cost if plywood costs $12 per square foot? Round your answer to the nearest cent. *Hint*: The altitude of an isosceles triangle is the perpendicular bisector of its base.

10. In the figure below, ABC is an isosceles triangle, DE is parallel to BC, AD has length 10 inches, AB has length 12 inches and DE has length 8 inches. What is the area of triangle ABC to the nearest square inch?

11. A truck crosses an intersection going north at 40 miles per hour. One half hour later, a car crosses the same intersection going east at 50 miles per hour. How many miles apart are the car and the truck 15 minutes after the car leaves the intersection?

12. The sail on the sailboat shown below forms a right triangle whose hypotenuse has length 13 feet and whose vertical side has length 12 feet. If cloth for the sail costs $10 per square foot, what is the cost of the sail?

13. In the figure below, DE is parallel to AB, AB has length 8 centimeters, BE has length 5 centimeters, and EC has length 7 centimeters. What is the length of DE rounded to the nearest tenth of a foot?

14. Becky is 10 miles east B   E   C of Sarah when both begin running as shown in the figure below. Sarah runs north at 8 miles per hour and Becky runs south at 7 miles per hour. How far apart are the two girls 30 minutes later?