

## Area and Perimeter

Choose problems appropriate to your grade and math background. Do all your calculations with paper and pencil, and include your neat calculations with the work you submit to your teacher. Make neat drawings and diagrams to help you. Please be sure to use correct units!

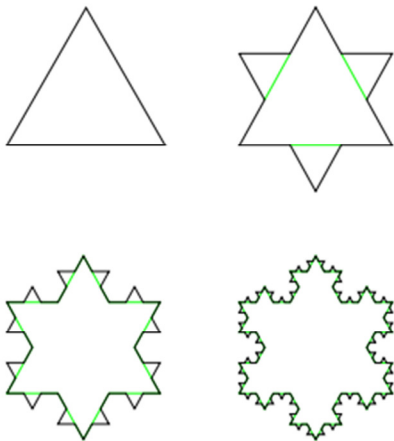
- 1) A rectangle is 6 cm long and 2 cm wide. What is its area and perimeter?
- 2) A rectangle measures 3 in. by 1 in. What is its area and perimeter?
- 3) The playground at the Pine School is 12 yards by 15 yards. If the school wants to build a fence around it, how many yards of fence do they need?
- 4) Ann's garden has an area of 80 sq. ft. It's 10 ft. long. How wide is it?
- 5) Draw two different rectangles with areas of 12 sq. cm.
- 6) Draw two different rectangles with perimeters of 12 in.
- 7) Which is larger, a rectangle with area 10 square inches, or a rectangle with area 40 square cm? Make a drawing to show you're correct.
- 8) Measure the area and perimeter of a rectangle in our school or in your home.
- 9) Of all the rectangles with perimeter 40 cm, which has the greatest area? Explain! Is there one with the least area? Explain!
- 10) A rectangle measures  $4\frac{1}{2}$  inches by  $2\frac{3}{4}$  inches. What is its area and perimeter?
- 11) A rectangle measures 8.7 cm by 5.6 cm. What is its area and perimeter?
- 12) A rectangle is 175 ft. by 159 ft. What is its area and perimeter?
- 13) King Cuadro had a square window. It measured 1 meter by 1 meter. He told his carpenter that this window let in too much light. He wanted a new window, "just as high, just as wide, with half the area, and still in the shape of a square." Surprisingly, the carpenter, who was a *very* good problem solver, fulfilled all these requirements. Explain how! Draw the new window! Give the area and perimeter of the new window. Hint: The carpenter did not say to himself, "This is impossible because..." Instead he said things like, "Okay, what do I know? Assuming this is possible, what's my first step?"
- 14) A right triangle has a hypoteneuse of 17 cm, and one leg measures 8cm. What is its area and perimeter?

15) Area and perimeter measure different things and use different units. But we can think of them just as numbers. Can you find a rectangle where its area number equals its perimeter number? Can you find more than one solution? Can you find a pattern or formula for all solutions?

16) Delores decided to make a huge play area for her school, in the shape of a circle with a diameter of one mile. How much fencing did she need to go around that circle? What was the area of her circle? (Note that in circles we use the word “circumference” instead of “perimeter.”)

17) June got 30 feet of fencing for her vegetable garden. She decided to use the back wall of her big garage as one side of the rectangular garden. What rectangle should she make with the 30 ft. of fencing to give her the biggest area? Explain! (This problem may be fun if you know how to graph quadratic functions.)

18) Here’s how to make a Koch Snowflake. Start with an equilateral triangle. (You might want to try sides of 9 cm, or if your paper is big enough, sides of 27 cm.) Divide each side into three equal segments. On the middle segment of each side draw a new equilateral triangle facing out, and erase the base of that triangle. So each side has been replaced by four line segments. For the next level, divide each current side into three equal parts, and build an equilateral triangle facing out on each of those, erasing the base. And so on. Call our original equilateral triangle level zero. Make a table showing the area and perimeter for each level you can draw. How is the perimeter changing with each iteration? How is the area changing? The Koch Snowflake is what you get if you continue this process forever. What can you predict about its perimeter? Its area?



19) Have fun!