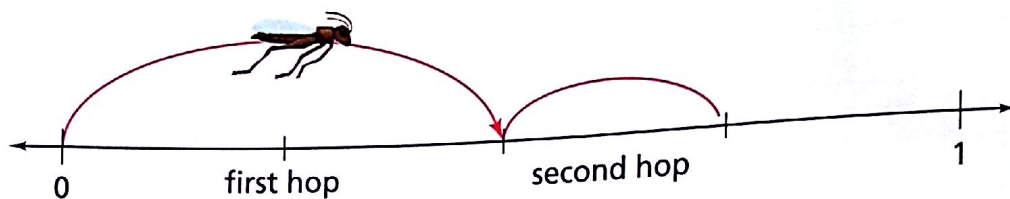


10. A cricket is on the 0 point of a number line, hopping toward 1. She covers half the distance from her current location to 1 with each hop. So, she will be at  $\frac{1}{2}$  after one hop,  $\frac{3}{4}$  after two hops, and so on.

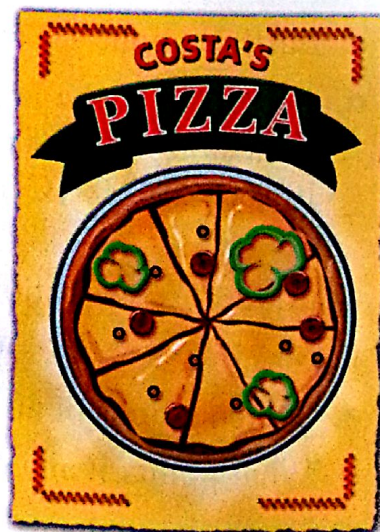


- Make a table showing the cricket's location for the first 10 hops.
  - Where will the cricket be after  $n$  hops?
  - Will the cricket ever get to 1? Explain.
11. The pizza in the ad for Mr. Costa's restaurant has a diameter of 5 inches.
- What are the circumference and area of the pizza?
  - Mr. Costa reduces his ad to 90% of its original size. He then reduces the reduced ad to 90% of its size. He repeats this process five times. Extend and complete the table to show the diameter, circumference, and area of the pizza after each reduction.

**Advertisement Pizza Sizes**

Reduction Number	Diameter (in.)	Circumference (in.)	Area (in. <sup>2</sup> )
0	5	■	■
1	■	■	■

- Write equations for the diameter, circumference, and area of the pizza after  $n$  reductions.
- How would your equations change if Mr. Costa had used a reduction setting of 75%?
- Express the decay factors from part (d) as fractions.
- Mr. Costa claims that when he uses the 90% reduction setting on the copier, he is reducing the size of the drawing by 10%. Is Mr. Costa correct? Explain.





12. Answer parts (a) and (b) without using your calculator.

- a. Which decay factor represents faster decay, 0.8 or 0.9?  
b. Order the following from least to greatest:

$0.9^4$        $0.9^2$       90%       $\frac{2}{10}$        $\frac{2}{9}$        $0.8^4$       0.84

## Extensions

13. Freshly cut lumber, known as *green lumber*, contains water. If green lumber is used to build a house, it may crack, shrink, and warp as it dries. To avoid these problems, lumber is dried in a kiln that circulates air to remove moisture from the wood. Suppose that, in 1 week, a kiln removes  $\frac{1}{3}$  of the moisture from a stack of lumber.
- a. What fraction of the moisture remains in the lumber after 5 weeks in a kiln?
- b. What fraction of the moisture has been removed from the lumber after 5 weeks?
- c. Write an equation for the fraction of moisture  $m$  remaining in the lumber after  $w$  weeks.
- d. Write an equation for the fraction of moisture  $m$  that has been removed from the lumber after  $w$  weeks.
- e. Graph your equations from parts (c) and (d) on the same set of axes. Describe how the graphs are related.
- f. A different kiln removes  $\frac{1}{4}$  of the moisture from a stack of lumber each week. Write equations for the fraction of moisture remaining and the fraction of moisture removed after  $w$  weeks.
- g. Graph your two equations from part (f) on the same set of axes. Describe how the graphs are related. How do they compare to the graphs from part (e)?
- h. Green lumber is about 40% water by weight. The moisture content of lumber used to build houses is typically 10% or less. For each of the two kilns described above, how long should lumber be dried before it is used to build a house?

