Real-World Area Problems
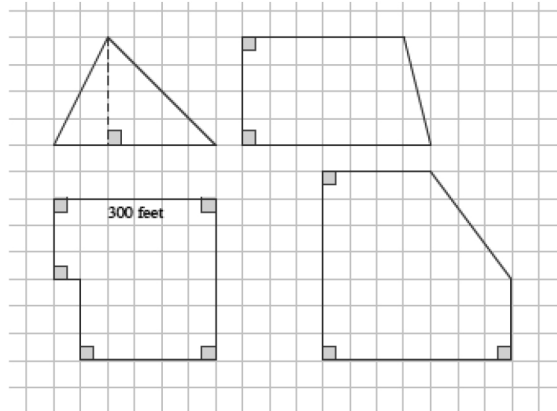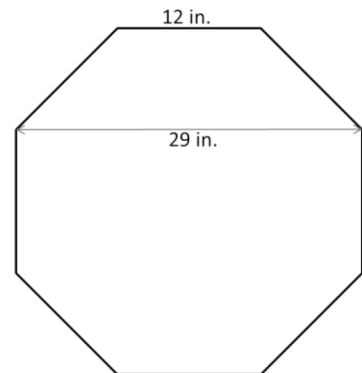
A homeowner called in a painter to paint bedroom walls and ceiling. The bedroom is   ft. long,   ft. wide, and   ft. high. The room has two doors each   ft. by   ft. and three windows each   ft. by   ft. The doors and windows do not have to be painted. A gallon of paint can cover ft^2. A hired painter claims he will need   gal. Show that the estimate is too high.
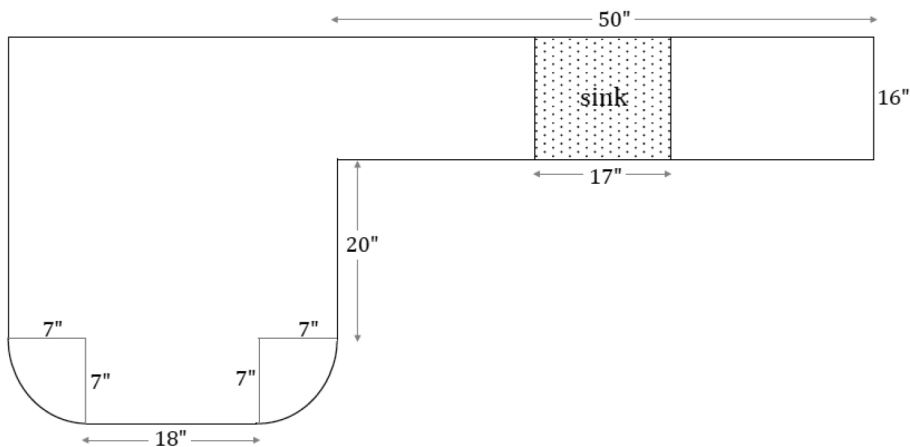
1. A farmer has four pieces of unfenced land as shown below in the scale drawing where the dimensions of one side are given. The farmer trades all of the land and   for   acres of similar land that is fenced. If one acre is equal to   ft^2, how much per square foot for the extra land did the farmer pay rounded to the nearest cent?
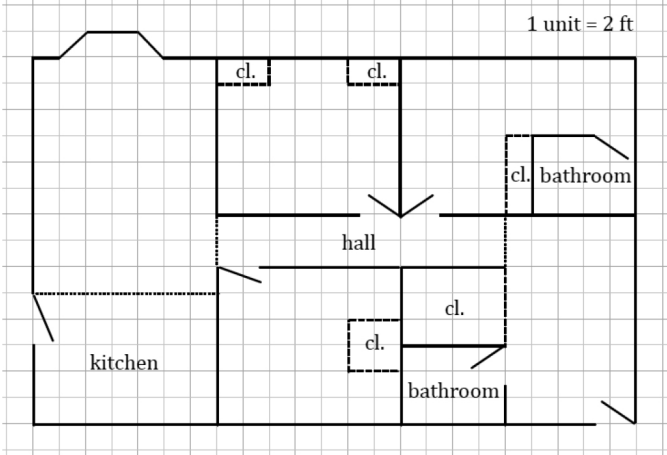

300 feet

2. An ordinance was passed that required farmers to put a fence around their property. The least expensive fences cost   for each foot. Did the farmer save money by moving the farm?

3. A stop sign is an octagon (i.e., a polygon with eight sides) with eight equal sides and eight equal angles. The dimensions of the octagon are given. One side of the stop sign is to be painted red. If Timmy has enough paint to paint   ft^2, can he paint   stop signs? Explain your answer.

12 in.

29 in.

4. The Smith family is renovating a few aspects of their home. The following diagram is of a new kitchen countertop. Approximately how many square feet of counter space is there?

50"

sink

16"

17"

20"

7"   7"

7"   7"

18"

5. In addition to the kitchen renovation, the Smiths' are laying down new carpet. Everything but closets, bathrooms, and the kitchen will have new carpet. How much carpeting must be purchased for the home?

6. Jamie wants to wrap a rectangular sheet of paper completely around cans that are   – in. high and   in. in diameter. She can buy a roll of paper that is   – in. wide and   ft. long. How many cans will this much paper wrap?

A homeowner called in a painter to paint bedroom walls and ceiling. The bedroom is   ft. long,   ft. wide, and   ft. high. The room has two doors each   ft. by   ft. and three windows each   ft. by   ft. The doors and windows do not have to be painted. A gallon of paint can cover ft^2. A hired painter claims he will need   gal. Show that the estimate is too high.

Area of 2 walls: *ft.*   *ft.*   *ft^2*

Area of remaining 2 walls: *ft.*   *ft.*   *ft^2*

Area of ceiling: *ft.*   *ft.*   *ft^2*

Area of 2 doors: *ft.*   *ft*   *ft^2*

Area of 3 windows   *ft.*   *ft*   *ft^2*

Area to be painted: *ft^2*   *ft^2*   *ft^2*   *ft^2*   *ft^2*   *ft^2*

Gallons of paint needed: *The painter will need a little more than   gal.*

The painter's estimate for how much paint is necessary was too high.

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1. A farmer has four pieces of unfenced land as shown below in the scale drawing where the dimensions of one side are given. The farmer trades all of the land and   for   acres of similar land that is fenced. If one acre is equal to ft^2, how much per square foot for the extra land did the farmer pay rounded to the nearest cent?

    300 feet

       —

       —

               —
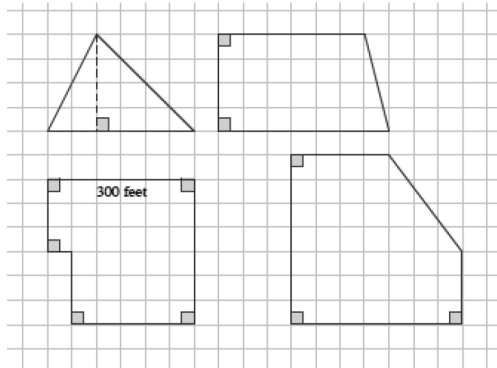
    The sum of the farmer's four pieces of land:

    The sum of the farmer's four pieces of land in sq. ft.:

       units   *ft. divide each side by*

       unit   *ft. and*   *$unit^2$*   *ft^2*

    The total area of the farmer's four pieces of land: *ft^2.*

The sum of the farmer's four pieces of land in acres:

The farmer's four pieces of land total about   acres.

Extra land purchased with   :   acres   acres   acres

Extra land in square feet:

                                  _____

Price per square foot for extra land:

                                  _____

2. An ordinance was passed that required farmers to put a fence around their property. The least expensive fences cost   for each foot. Did the farmer save money by moving the farm?

    At   for each foot,   would purchase   feet of fencing. The perimeter of the third piece of land (labeled   ) has perimeter   ft. So it would have cost over   just to fence that piece of property. The farmer did save money by moving the farm.

3. A stop sign is an octagon (i.e., a polygon with eight sides) with eight equal sides and eight equal angles. The dimensions of the octagon are given. One side of the stop sign is to be painted red. If Timmy has enough paint to paint   ft^2, can he paint   stop signs? Explain your answer.

    area of top trapezoid $-$ in.   in.   in.   in^2

    area of middle rectangle   in.   in.   in^2

    area of bottom trapezoid $-$ in.   in.   in.   in^2

    Total area of stop sign in square inches:

                        in^2 in^2 in^2 in^2

    Total area of stop sign in square feet:

            _____

    Yes, the area of one stop sign is less than   ft^2 ft^2 . Therefore,   stop signs would be less than   ft^2.
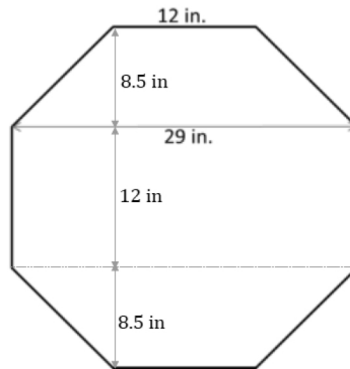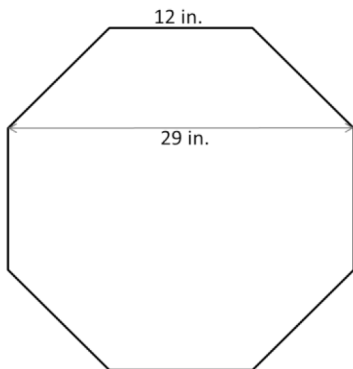
4. The Smith family is renovating a few aspects of their home. The following diagram is of a new kitchen countertop. Approximately how many square feet of counter space is there?
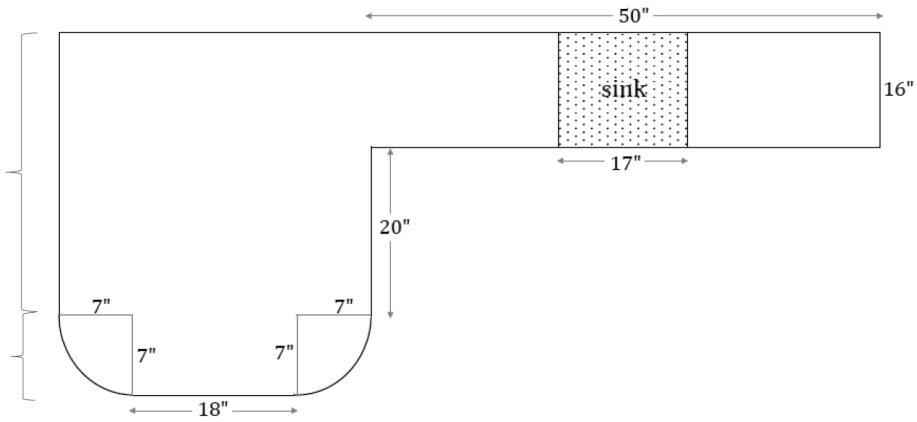

Total area of counter space in square inches:

Total area of counter-space in square feet:

———

There is approximately _____ ft^2 of counter space.

5. In addition to the kitchen renovation, the Smiths' are laying down new carpet. Everything but closets, bathrooms, and the kitchen will have new carpet. How much carpeting must be purchased for the home?

1 unit = 2 ft

cl.   cl.

cl. bathroom

hall

cl.

cl.

kitchen

bathroom
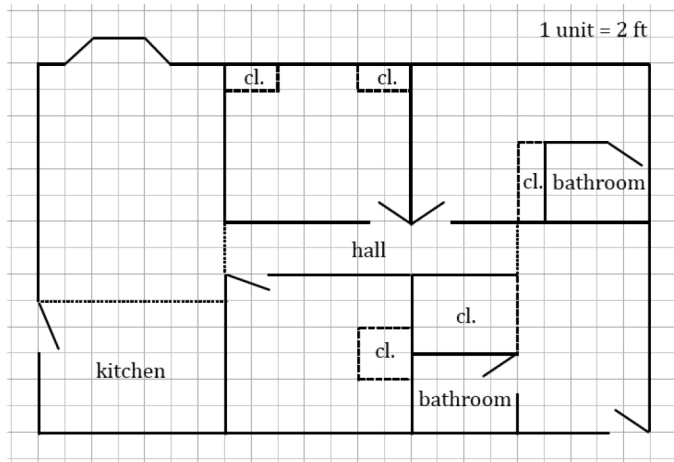
Total area that needs carpeting:

Scale factor: ;   .

Total area that needs carpeting in square feet:

———

6. Jamie wants to wrap a rectangular sheet of paper completely around cans that are − in. high and   in. in diameter. She can buy a roll of paper that is − in. wide and   ft. long. How many cans will this much paper wrap?

inch diameter cans have a circumference of   in., approximately   in.   ft. is the same as   in.;   in.   in. is approximately   in., so this paper will cover   cans.