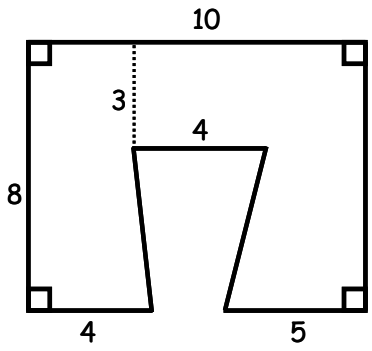
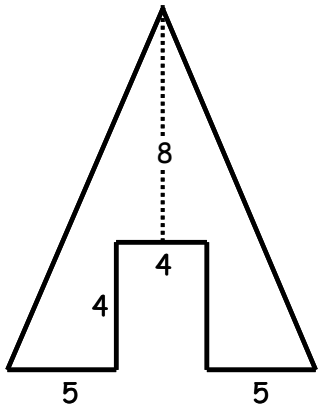
Blue – Area, Parallelogram, Triangle

1. A swimming pool is 40 ft. by 20 ft. A fence surrounding the pool is 40 ft. by 70 ft. How much deck space is around the pool?
   (Hint: Draw a picture to represent the measurements).

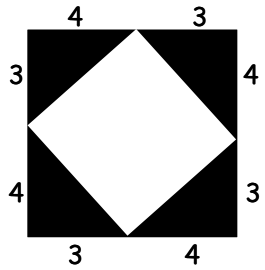
Find the area of each shape:

2. 

3. 

4. **a.** What fraction of the large square has been shaded?

   b. What fraction of the large square in unshaded?



5. A square 15 cm long and a rectangle 18 cm long have the same perimeter. Find the area of the rectangle.

6. Carlos is training for his 4.8 km run on a rectangular running track. If the running track measures 50 m wide and has an area of 7500 m^2, how many laps around the track must he run?

7. Lina has a rectangular piece of drawing paper 36 cm long and 21 cm wide. She pasted a rectangular picture in its center such that it is 3 cm away from its length and 8 cm away from its width. What is the area of the drawing?

8. A rectangular photo frame has a length of 24 cm and an area of 432 cm^2. In its center is a rectangular piece of photograph 3 cm away from its length and 2 cm away from its width. Find the area of the photo frame which is not covered by the photograph.

9. A square and a rectangle have the same area. If the rectangle has a length of 32 cm and a perimeter of 80 cm, find the length of the square.

10. A rectangular garden has an area of 486 m^2. If it is 18 m wide, find the cost of fencing it at $16 per meter.

11. A rectangle is three times as long as it is wide. If it has a perimeter of 64 cm, find its area.

12. The perimeter of a square room is 36 m. What is the cost of tiling it at $8 per square meter?

13. A rectangular piece of land 78 m wide has a perimeter of 386 m. It has a pond with an area of 236 m^2 in it. If the rest of it is covered with grass, what area of the land is covered with grass?

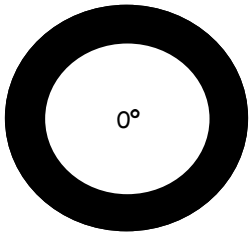
14. A sheet of A4 paper measures 296 mm by 212 mm. It is printed with a 7 mm by 7 mm square grid for use in a Maths classroom. Estimate the number of squares on the sheet, to the nearest hundred.

15. The floor of a kitchen is rectangular, and measures exactly 3 m by 5 m. It is to be tiled with cork tiles measuring 250 mm by 250 mm.

a. Will any of the tiles need to be cut into smaller pieces? Explain.

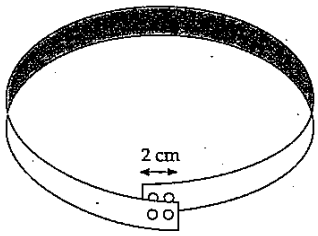
b. Calculate the number of tiles that will be needed.

16. Find the shaded area. The figure shows two circles. The inner circle has a radius of 8 cm and the circumference is 5 cm away from the circumference of the outer circle. (take π = 3.14)



17. A dart-board is held together around the outside by a metal band. One end of the band overlaps the other by 2 cm so it can be fixed on.

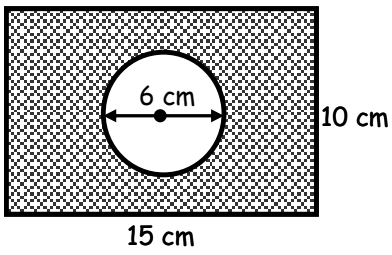
The radius of the dartboard is 210 mm. Calculate the length of the metal band.



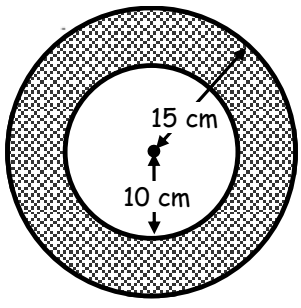
18. The radius of a bicycle wheel is 75 cm. How far has the bicycle travelled when the wheel has rotated once?

Find the shaded area of

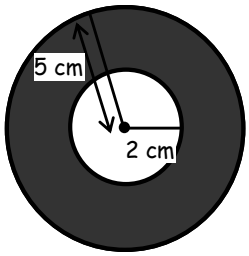
19.



20.



21. The diagram shows a circle with a radius of 2 cm inside a circle with a radius of 5 cm. Calculate the area of the shaded region.

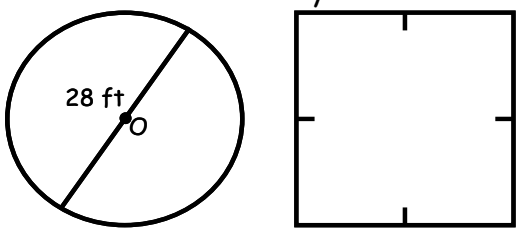


22. Compact disks (CDs) are usually packaged in square plastic cases. These cases measure 124 mm by 124 mm. A CD fits in the center of a case. There is a distance of 3 mm between the edge of the CD and the edge of the case.

Sketch a diagram to show this information.
Calculate the area of a CD (top only).

23. In the figure shown, the circle and the square have the same perimeter.

Find the difference in their areas. (Take $\pi = \frac{22}{7}$)



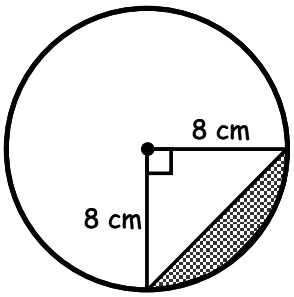
24. The diagram shows a triangle and a segment inside a circle. The radius of the circle is 8 cm.

a. Calculate the area of the circle.

b. Calculate the area of the triangle ($A = \frac{1}{2} \times b \times h$).

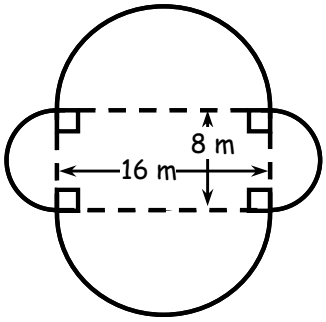
c. True or false: 'Area of triangle + Area of segment = $\frac{1}{4}$ x Area of circle'?

d. Calculate the area of the segment.

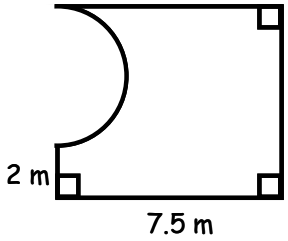


Find the area of each shape showing all working.

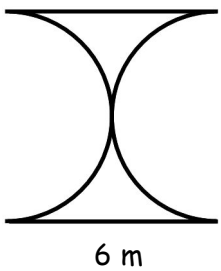
25.



26.

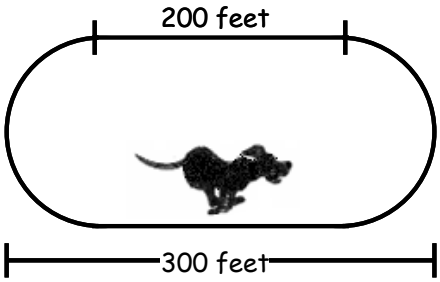


27.

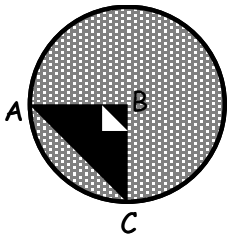


28. The space shuttle orbited the earth 20 times at an altitude of 280 miles. If the diameter of the earth is 8000 miles, how many miles did the space shuttle travel?

29. If a greyhound dog needs a training run of 3 miles, how many times will it need to run around the track. Round your answer to the nearest whole number. (The ends of the track are semicircles)



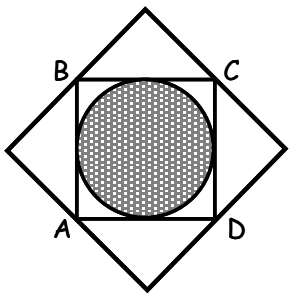
30.



A circle has a radius of 8 feet. If you travel from point A to B to C then back to A along the circle, how far will you have traveled? The radius of the circle.

31.

The area of the outside square is 16 inches. Points A, B, C, and D are midpoints on their respective lines. What is the diameter of the shaded circle?



32. Frog Farming

Farmer Mead would like to raise frogs. She wants to build a rectangular pen for them and has found 36 meters of fencing in her barn that she'd like to use.

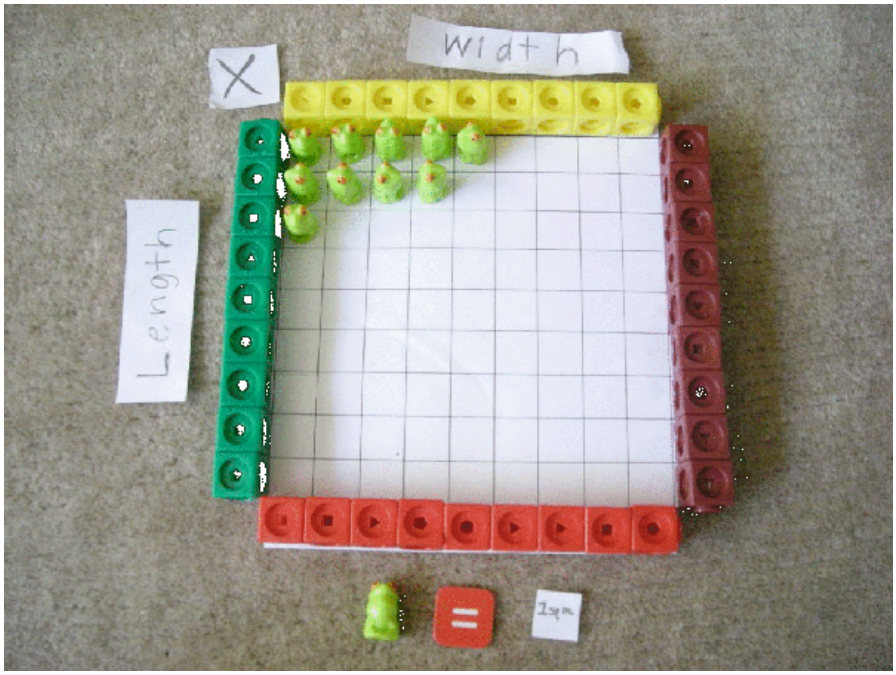
Design at least four different rectangular pens that she could build. Each pen must use all 36 meters of fence. Give the length and width for each of the pens.

If each frog needs one square meter of area (1 m2), how many frogs will each of your four pens hold?

Be sure to explain your strategy and your reasons for your steps.

Extra: Farmer Mead wants to build the rectangular pen that will hold the maximum number of frogs. Find the dimensions of that pen and tell how you know you're correct.

33.



Tangrams

Tangrams have been a popular puzzle for a long time. A set consists of one small square, one parallelogram, and triangles of three different sizes. All seven pieces can fit together to form a large square.

How many of the small triangles would it take to cover the large square?

Pretend that each small triangle costs 5¢, based on its area. How much would each of the other pieces cost?

What would be the value of the complete set?

Be sure to explain how you solved the problem.

Extras:
What fraction of the area of the large square is each piece?
What percent of the total area of the large square is made up of triangles? Explain.

34. Nova Scotia Quilt

One of my favorite places to visit in Nova Scotia is the Museum of Industry in Stellarton. On my last trip I enjoyed a special exhibit on antique bed quilts.

One quilt in particular grabbed my attention. It was rectangular and was made entirely of one-inch squares, 5467 of them according to the description next to it. I wondered if I could determine the length and width of the quilt with only that information. I did, and I bet you can, too!

What are the most likely dimensions of the quilt?

Be sure to explain how you found them and how you know you have found the best answer.

Extra: If you spread this quilt evenly on a standard double bed, 54" wide and 75" long, with the shorter edge of the quilt along the head of the bed, how much would hang down on each side?

35. Lost in Space

I'm sure you've all heard about the costly mix-up resulting in the loss of NASA's Mars Climate Orbiter in late September of 1999. It seems the engineers in Colorado were working with English units and the engineers in California were working with metric units. Neither group caught the discrepancy!

This is a pretty hard lesson about how important units are, especially considering the spacecraft was worth about $125 million. Yipes! I'd hate to have to pay for that out of my allowance.

Let's take a look at this error on a smaller scale. Suppose the engineers in Colorado designed a square panel that was one yard by one yard, but the engineers in California thought the panel was one meter by one meter when they constructed it.

What is the difference, expressed in metric units, in the areas of the two panels?

Bonus: Express this difference as a percentage of the smaller panel (i.e., the bigger panel is ? percent larger than the smaller panel).

36.

When planting a garden of flowers and vegetables in central New Jersey, you must surround it with a fence to protect it from the deer. Last summer I planted a long, skinny garden all the way along a 30 foot wooden fence (southern exposure, of course), so that I would only need to put a netting fence up along three sides of it. Because my garden was so long, I only made the sides of the garden 1 foot wide.	

This year I decided to move my garden to another spot in the yard where there isn't a permanent fence and I changed the shape. I made my garden 6 feet by 8 feet.

How much larger is the area of my garden this year?

My garden is larger, so I was thinking I had to go to the store to buy more netting. I did some calculations to find out what I would need to buy.

How does the amount of netting I'll need this year compare to what I needed last year?

Extra: So that my snow peas can grow in rich, fertile soil, I like to add a layer of mushroom soil that is 6 inches deep before I plant my seeds. How many cubic feet of soil will I use this year?

37. Frugal Flooring

Graeme is very excited. His parents have decided that he should have his very own bedroom. They have also said that Graeme can decorate it any way he wants to so long as he does not go over his budget of $350.00.

Graeme really likes the way the room looks already except for the floor. He decides that he would like to tile the floor in his two favorite colors: alien green, and midnight black. In a catalog, he has found a set of 9-inch-square floor tiles in his two favorite colors. Graeme needs to figure out how many tiles he will need for his 12 ft. by 15 ft. room, and whether he can afford to buy them.

How many tiles will Graeme need?

Bonus: If tiles are sold in packages of 12 for $12.95 each (including tax), can Graeme afford the tiles?

38. Pig Pens

Farmer Mead has 36 guinea pigs on her farm. She wants to build one rectangular pen they can all run around in. She must allow one square meter of area (1 m^2) for each guinea pig in the pen. The fencing costs one dollar per meter.

Find three different rectangular pens that have exactly the area needed for 36 guinea pigs.

What are the dimensions of each pen?

How much would each cost?

Extra: What are the dimensions and cost of the least expensive rectangular pen that would hold 36 guinea pigs? Explain how you know you have found the cheapest pen.

Solutions

1. (40 x 70) – (40 x 20)
2800 – 800
= 2000 ft²

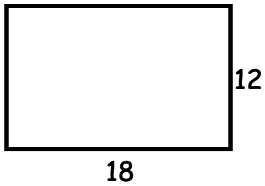
2. 62.5

3. ($\frac{1}{2}$ x (8 + 4) x (5 + 4 + 5)) – (4 x 4)
84 – 16
= 68 unit²

4. a. $3^2 + 4^2 = n^2$
$n = 5$
5 x 5 = 25 (area of white diamond)
(4 + 3)(4 + 3) = 49 (area of the black square)
$= \frac{24}{49}$

b. $\frac{25}{49}$ (explained above)

5. Square → 15 x 4 = 60 cm (perimeter)
Rectangle → 60 – (18 x 2)
60 – 36 = 24
24 : 2 = 12



18 x 12
= 216 cm²

6. 4.8 km = 4800 m

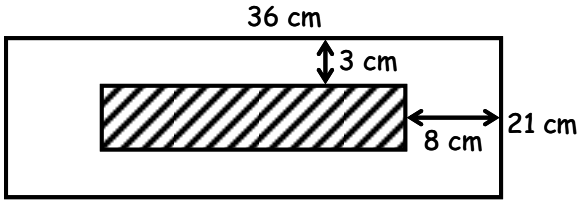
$7500\ m^2 = 50\ m \times n$

$150m = n$

$4800 : ([150 + 50])$

$= 12$ laps

7.

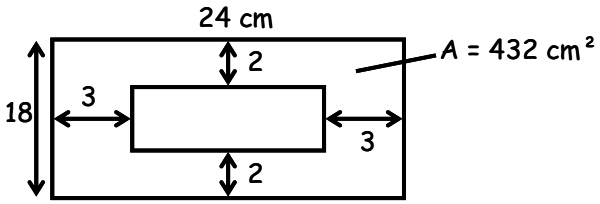


$[21 - (8 \times 2)] \times [36 - (3 \times 2)]$

$= 5 \times 30$

$= 150\ cm^2$

8.



$432 = 24 \times n$

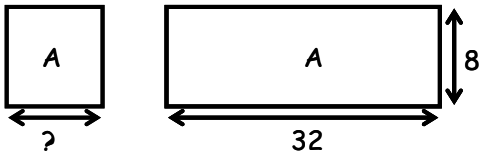
$n = 18$

$(24 \times 18) - ((24 - 6) \times (18 - 4))$

$= 432 - (18 - 14)$

$= 108\ cm^2$

9.



P = 80 cm

$(32 \times 2) + (2n) = 80$

$64 + 2n = 80$

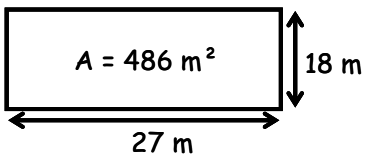
$n = 8$

Area:

$32 \times 8 = 256$

$\sqrt{256} = 16$ cm

10.



$486 = 18 \times n$

$27 = n$

Find perimeter: $(18 \times 2) + (27 \times 2)$

$= 90$ m

90×16

$= \$1{,}440$

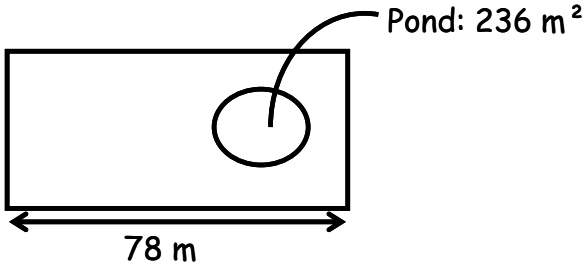
11.

Perimeter = 64 cm
Area?
$(3n \times 2) + (n \times 2) = 64$
$6n + 2n = 64$
$n = 8$
24×8
$= 192\ cm^2$

12.

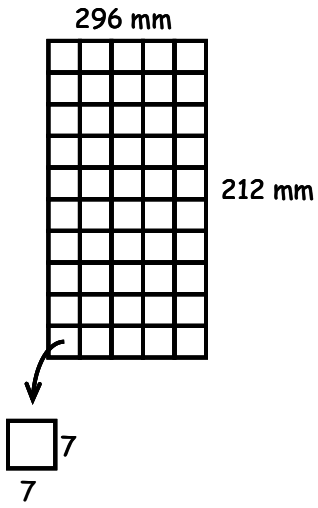
P = 36 cm
$4n = 36$
$n = 9$
Area = $9 \times 9 = 81\ m^2$
81×8
= $648

13.



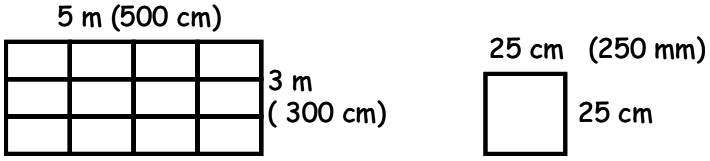
Perimeter = 386 m
Find area of garden:
$(78 \times 2) + (2n) = 386$
$n = 115$
$115 \times 78 = 8970$
$8970 - 236$
$= 8734\ m^2$

14.



Area of paper : 62752 mm²
Area of square: 7 x 7 = 49 mm²
# of squares: $\frac{62752}{49}$
= 1280.6530 → nearest hundreds
= 1300

15.



a. No

b. $\frac{(500 \times 300)}{(25^2)}$

= 240 (It's a whole number, therefore the tiles don't have to be cut into smaller sizes)

16. πr^2 = area of circle
$\pi (8 + 5)^2 - \pi(8)^2$
$= 169\pi - 64\pi$
$= 105\pi$
= 329.7 cm²

17. $2\pi r$ = perimeter
2π(210 mm) + 20 mm (2cm)
= 1318.8 + 20
= 1338.8 mm
= 133.9 cm

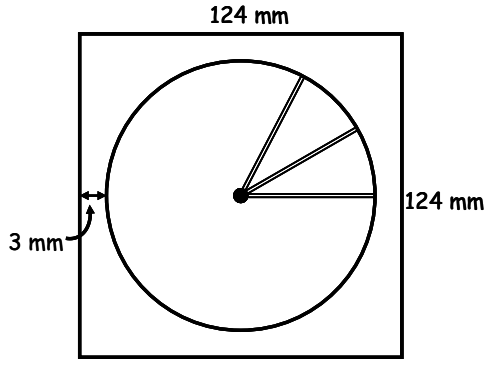
18. $2\pi r$
2π (75)
= 471 cm

19. (15 x 10) – (π (3)²)
= 121.74 cm²

20. $\pi(15)^2 - \pi(10)^2$
= 392.5 cm² (also 125π cm²)

21. $\pi(5)^2 - \pi(2)^2$
$= 65.97\ cm^2$

22.



$124 - (3 \times 2)$
$= 118$ = circumference
Radius = 59
Area = $\pi(59)^2$
$= 10930.34\ mm^2$

23. $2\pi r$
$(2)(\frac{22}{7})(14)$
$= 88$ ft
$4n = 88$
$n = 22$
A of $\square$ = $22 \times 22 = 484$
A of $\bigcirc$ = $\pi(14)^2 = 616$
$616 = 484$
$= 132\ ft^2$

24. **a.** $\pi(8)^2 = 200.96 = 64\pi\ cm^2$

b. $\frac{1}{2} \times 8 \times 8 = 32\ cm^2$

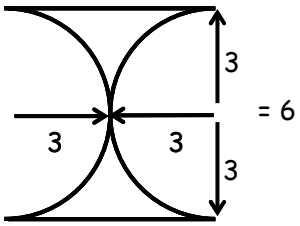
c. True

d. $\frac{64\pi}{4} = 16\pi - 32 = 18.24$

25. $(\pi(8)^2) + (\pi(4)^2) + (16 \times 8)$
$80\pi + 128$
$= 379.2\ m^2$

26. $52.5 - 6.25\pi$

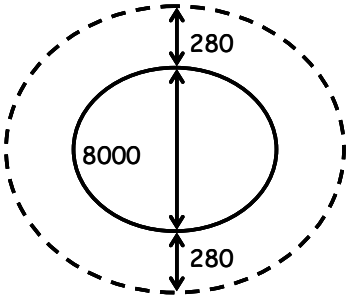
27.



$\pi(3)^2$
$= 9\pi$

6 x 6
$= 36 - 9\pi$

28.

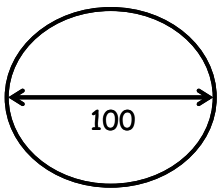


20 x perimeter of circle
8000 + 2(280)
= 8560 miles

Circumference = πd
$\pi(8560) = 26,878.4$
= 26,878.40 x 20
= 537,568 miles

The diameter of the orbit is 280 + 8000 + 280 = 8560 miles.
The circumference is 3.14 x 8560 = 26,878.4
26,878.4 x 20 orbits = 537,568 miles

29.



300 – 200 = 100
$= \pi 100$
$314 + (200)^2$
= 314

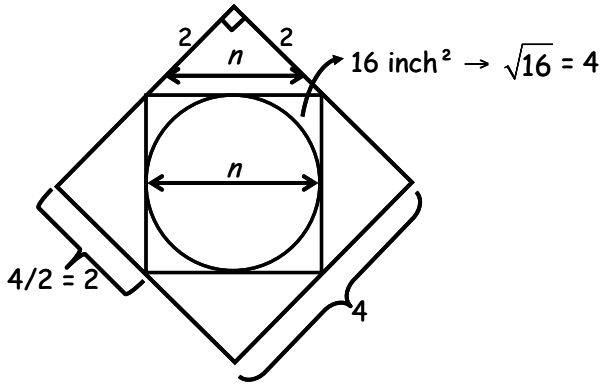
Total d of track = 714 ft
5280 ft = 1 mile
5280 x 3 = 15840 ft.
$\frac{15840}{714} = 22.18$

22 times
Each end if the track is half of a circle with a 100 foot diameter and 314 foot circumference. The distance around the track is 200 + 200 + 314 = 714 feet.
3 miles is 5280 x 3 = 15,840 feet
15,840 ÷ 714 feet per lap = 22.18 laps

30. $\frac{1}{4}$ of circumference
$\frac{1}{4}$ x □(8 x 2)
= 12.56 ft
12.56 + $\overline{AB}$ + $\overline{BC}$ = 28.56 ft
(8) (8)

28.56 inches
If the radius is 8 feet, the diameter is 16 feet and the circumference is 50.24 feet.
$\frac{1}{4}$ of the circumference is 50.24 ÷ 4 = 12.56 feet
8 feet + 8 feet + 12.56 feet = 28.56 feet

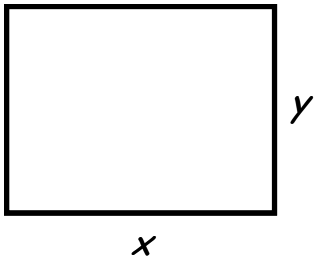
31.



16 inch² = $\sqrt{16}$ = 4
Square = use Pythagorean theorem
$a^2 + b^2 = c^2$
$2^2 + 2^2 = 8$
$\sqrt{8} = c$
$\sqrt{8}$ or $2\sqrt{2}$
Because the area of the large square is 16, the length of each is 4 inches. Each half-side is then 2 inches.

The length of BC can by found by using Pythagorean Theorem:
$a^2 + b^2 = c^2$ $2^2 + 2^2 = c^2$ $c = \sqrt{8}$

32.



P = 36 meters
$2x^2 = 36$
$x^2 = \frac{36}{2}$
$x^2 = \sqrt{18}$
$x = 9$

Dimensions:

9 x 9
14 x 4
17 x 1
15 x 3

$x + y = \frac{36}{2}$
9 + 9 = 18
17 + 1 = 18
15 + 3 = 18
14 + 4 = 18

(there are many other possibilities… the l and b must = 18)

Find greatest area = most frogs
9 x 9 = 81^2
14 x 4 = 81^2
17 x 1 = 81^2
15 x 3 = 81^2
Most frogs = 9 x 9 (each frog = 1 m^2)

1. My first design is 9 meters by 9 meters. My second is 14 by 4, my third is 15 by 3, my fourth is 17 by 1. 2. My first design would fit 81 frogs, my second would fit 56, my third would fit 45, my fourth would fit 17. Extra: 9 x 9 pen would hold

1. A rectangle has at least two pairs of equal sides, and a square is also a rectangle, so for my first design I decided to divide 36 by 4. That's 9. (Width = 9; length = 9.) For my second design, I decided to do a rectangle: 14 + 14 + 4 + 4 = 36. (Width = 14; length = 4.) For my third design, I decided to do 15 + 15 + 3 + 3 = 36. (Width = 15; length = 3.) For my fourth design, I decided to do 17 + 17 + 1 + 1 = 36. (Width = 17; length = 1.)

2. To find out how many frogs each pen can hold, I have to find out the area of each pen. To find out the area of each pen, I need to multiply the width by the length. For example, if the width of a rectangle was 2 meters and the length was 6 meters, then there would be 6 x 2 = 12 square meters. Each frog needs 1 meter square, so 12 frogs would fit in that pen. So, for my first design, 9 x 9 = 81; 81 frogs can fit. For my second design, 14 x 4 = 56; 56 frogs can fit. For my third design, 15 x 3 = 45; 45 frogs can fit. For my last design, 17 x 1 = 17; 17 frogs can fit. I used blocks and plastic frogs to help me understand why Width*Length = Area works. (See the picture below)

Extra: I used this chart to help me

Width		Length	Difference between W & L	# of Frogs (Area)	Difference from Area Before
1	*	17	16	17	
2	*	16	14	32	15
3	*	15	12	45	13
4	*	14	10	56	11
5	*	13	8	65	9
6	*	12	6	72	7
7	*	11	4	77	5
8	*	10	2	80	3
9	*	9	0	81	1

The first pattern I saw was that as the width grew bigger one by one, the length grew smaller one by one. The second pattern I saw was that as the width increases by one, the area increases by decreasing ODD numbers. (Look at the farthest right column.) The third patterns was that as the width increases and the length decreases, the difference between them is decreasing by EVEN numbers. You can tell that when the difference is zero, it can hold the most frogs.

Is it always like this with any number? I realized only perimeters of even numbers can make rectangles. I tried making designs with perimeter of 25, and it didn't work because a rectangle has 2 sets of lengths and widths that have to be equal to each other. So the number has to be divisible by 2.

I experimented with a number divisible by 4. (This means I can have 4 equal sides like above.) I picked number 24. Width x Length (Difference between Width and Length) = Area

1 * 11 (10) = 11
2 * 10 (8) = 20
3 * 9 (6) = 27
4 * 8 (4) = 32
5 * 7 (2) = 35
6 * 6 (0) = 36

When the difference between width and length is zero, the area is the greatest. So my method works.

Then I experimented with a number NOT divisible by 4. I picked 14. Width * Length (Difference between Width and Length) = Area

1 * 6 (5) = 6
2 * 5 (3) = 10
3 * 4 (1) = 12
4 * 3 (1) = 12
5 * 2 (3) = 10
6 * 1 (5) = 6

So the design with the biggest area is the 3(W) x 4(L) = 12(A) or 4(W) x 3(L) = 12(A). The difference isn't zero, but it's 1. And that's the smallest difference in the whole chart.

Rule: This works for both perimeters divisible by 4 and not divisible by 4. The design with the width and length of smallest differences has the biggest area.

33. 1. It would take 16 small triangles. 2. A large triangle would cost $.20. A small triangle will cost $.05. A med. triangle would cost $.10. A square would cost $.10. A parallelogram would cost $.10. 3. The whole set would cost $.80.

For part one I took the small triangles and put it on each one. Then I got the amount of each one. I put it into a chart.

The chart:

Square = 2 small triangles Small triangle = 1 small triangle (* 2 because there are two sm.triangles) Med. Triangle = 2 small triangles Large triangle = 4 small triangles (* 2 because there are two lg.triangles) Parallelogram= 2 small triangles

Then I added all the amounts together to get the amount of how many small triangles it would take.

The total is: 2 + 1 + 1 + 2 + 4 + 4 + 2 = 16
For part two I multiplied Each number by five.

Square = 2 x 5 = 10
Small triangle = 1 x 5 = 5 cents
Med. triangle = 2 x 5 = 10 cents
Large triangle = 4 x 5 = 20 cents
Parallelogram = 2 x 5 = 10 cents

I got the 5 from 5 cents for each sm. triangle. I got the other numbers (2,1,4) from how many triangles fit in each shape.

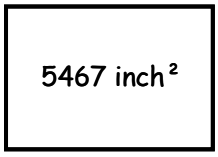
For the third part I added 5 cents + 5 cents + 20 cents + 20 cents + 10 cents + 10 cents + 10 cents = 80 cents

Extra: Part 1:
A large triangle is 4/16 of the total shape.
A small triangle is 1/16 of the total shape.
A med triangle is 2/16 of the total shape.
A parallelgram is 2/16 of the total shape.
A square is 2/16 of the total shape.

Part 2:
75% of the large square are triangles. First of all, from the chart I made in the first part I added all the fractions that had the triangles.

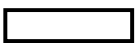
4/16 + 4/16 + 1/16 + 1/16 + 2/16 = 12/16
First I changed 12/16 to simplest form. The GCF of 12 and 16 is 4. So I divided the numerator and denominator by four to get 3/4. I knew 3/4 is equivalent to 75%.

34.



$x \cdot y = 5467$

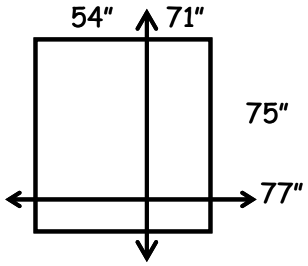
781 x 7 → 

497 x 11 → 

77 x 71 → 

5467 x 1 → _____
Most likely (since it's not just a length of tape) = 77" x 71"

Extra:



71″ – 54″ = 17″

$\frac{17''}{2}$ = 8.5″

77″ – 75″ = 2″

$\frac{2''}{2}$ = 1″

The most likely dimension of the quilt is: length = 77 inches and width = 71 inches Other possible dimensions of the quilt are: 1. length = 781 inches, width = 7 inches 2. length = 497 inches , width = 11 inches 3. length = 5467 inches, width = 1

The area of the rectangular quilt is 5467 square inches.

Area = length x width
5467 = length x width

The last digit of the quilt's area is 7. The product of two integer numbers that have results of 7 in the ones unit are: 7 x 1, and 3 x 9. Therefore the dimension of the quilt will be:

?7 x ?1 or ?3 x ?9

The quilt's area 5467 is divisible by 1, 7, 11, and 71. Therefore the possible dimensions of the quilt are:

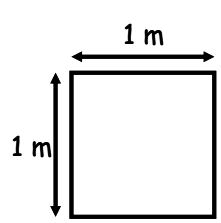
1 x 5467 = 5467
7 x 781 = 5467
11 x 497 = 5467
71 x 77 = 5467

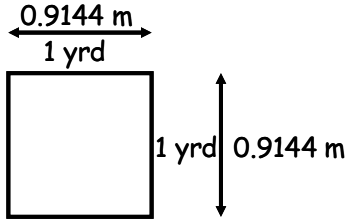
Extra:
The most likely dimension of the quilt is 71 x 77. Thus the width of the quilt is 71 inches. The difference between the quilt's width and the double bed's width is:

71 - 54 = 17 inches.

The hang down on each side of the bed is one half of the difference between the quilt's width and the double bed's width or 17/2 = 8.5 inches

35.





1 yrd = __?__ m
39.37" = 1 m
36" = 1 yrd
36: 39.37 = 0.9144 m

$1\ m^2 - (0.9144^2)$
$= 0.16386\ m^2$

Extra:
Area of panel = $0.9144^2 \rightarrow 0.836\ m^2$

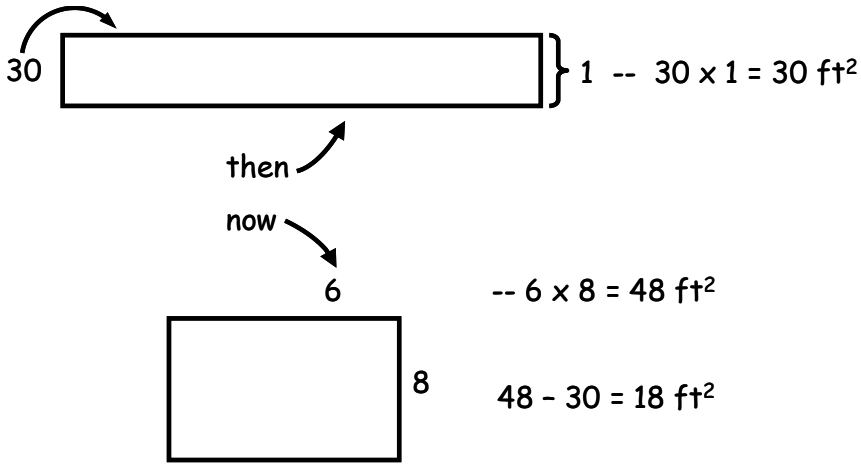
$\frac{0.16386}{0.836} = 0.1959$

$= 0.1959 \times 100$
$= 19.59\ \% \rightarrow 19.6\%$

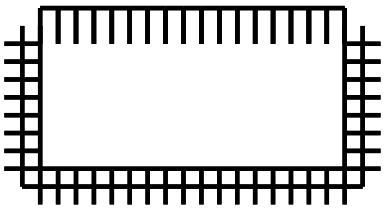
The answer is .1639 square meters difference.
Here is how I got my answer. We have to find the area difference in between the two different panels. Well, one panel is 1m by 1m and the other is 1y by 1y so the meter panel is 1 square meter of area and the yard panel is 1 square yard of area. There are 39.37 inches in a meter and 36 inches in a yard, so to convert a yard into metric units we divide 36 by 39.37, which equals .9144 meters. Now to turn that into the area I multiplied .9144 x .9144 which equals .8361 square meters of area. Now to find how much is in between .8361 square meters and 1 square meter I subtracted .8361 from 1 which equals .1639 m. So now I have .1639 square meters of area which is the difference.

Bonus: Now what I have to do is figure out what percentage of the smaller panel that the difference would take up if it were an empty panel. So I figured that if the area of the panel is .8361 square meters and the area of the difference equaled .1639 that I should divide .1639 by .8361 which equals around .1960. Now if a percentage is out of 100 than I have to multiply .1960 by 100 to get the answer, which equals 19.60. So there you have it .... 19.6%.

36.

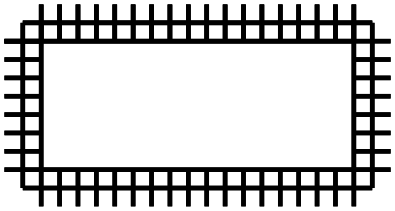


Last year:



→ 30 + 1 + 1 = 32 ft of netting

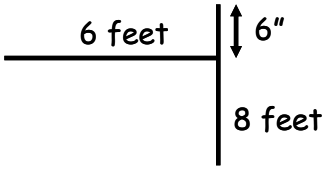
This year:



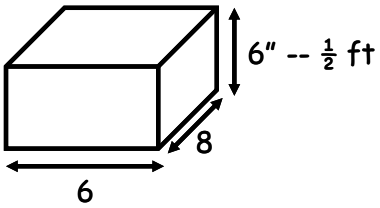
→ 6 + 6 + 8 + 8 = 28 ft of netting
30 + 1 + 1 = 32 ft of netting

I need 4ft less

Extra:



12″ = 1 feet
6″ = $\frac{1}{2}$ ft



6 x 8 x $\frac{1}{2}$ = 24 ft^3

1. This year, the area of your garden is 18 square feet more. 2. The amount of netting you will need this year is less than last year by 4 feet. Extra: This year, you will need 24 cubic feet of mushroom soil.

1. To find out how much larger your garden was this year, we had to find the area of both gardens. We had dot paper, so we decided to draw both of the gardens on our dot paper. Then we wrote the equations for each rectangle on the board.

The area of last year's garden was 1 ft by 30 ft, which is 1 x 30 = 30 square feet.

The area of this year's garden is 6 ft by 8 ft, which is 6 * 8 = 48 square feet.

We subtracted 48 – 30 = 18 square feet, which is the difference in area between your garden this year and last year.

2. To find out how much netting you needed this year compared to last year, we would need to figure out the perimeter for each year.

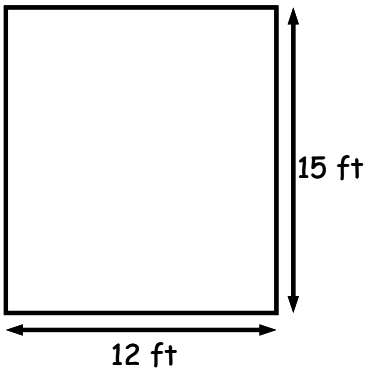
The perimeter for this year would be 8 + 6 + 8 + 6 = 28 feet. So you would need 28 feet of netting this year.

The perimeter you needed netting for last year was 1 + 30 + 1 = 32 feet. Since you already had a fence on one side, you didn't need to put netting on that side of the perimeter. So, you have enough netting already since you had 32 feet last year and only need 28 feet this year.

Extra: To find out how much mushroom soil you needed, you need to take the area of the garden and multiply that by how deep you want the soil to be. Since the area was in square feet, we had to convert the 6 in. depth of soil to 1/2 foot so the units would all be the same. Then to find out how much, we took 6 x 8 x 1/2 = 24 cubic feet.

37. How many tiles?

12 ft x 15 ft

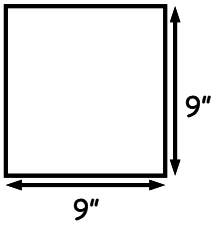


12 x 12 = 144″

144 : 9 = 16 tiles

15 x 12 = 180″

180 : 90 = 20 tiles



20 x 16 = 320 tiles

Bonus:

$$\frac{320 \text{ tiles}}{12 \text{ tile packets}} = 26.6667 \simeq 27 \text{ packs}$$

27 x 12.95 → 349.65

He can spend $350

Yes, he can afford it.

The answer to the problem is that Graeme needs 320 tiles so he can tile his floor. The bonus answer is that he can afford the tiles if he has an uneven amount of green and black , but he can't afford the tiles if he wants even amounts of each tile. The way I solved the problem was by making a picture of the room. I started by trying to find out how many tiles I need just for the 15 ft. side and then just for the 12ft side. I saw that I needed to convert the 15 ft. and 12ft. into inches if I wanted to find out how many tiles I need to cover the room. To convert these numbers to inches I multiplied the numbers by 12 because there are 12 inches in a foot. After I finished I had 15 feet as 180 inches and 12 feet as 144 inches. To find the number of tiles along the 12 foot side I divided 144 by 9 and got 16 tiles. To find the number of tiles along the 15 foot side I divided 180 by 9 and got 20 tiles. To find the amount it would take to cover the entire area I multiplied 12 by 15 and got 320 tiles.

To get the bonus answer thinking that he wanted to use an even number of each color tile I divided 320 by 2 to get 160. I then divided 160 by 12 to get the number of packages of each tile. He will need 14 packages. (Actually he needs 13 and part of another but you can't buy part packages). To find the cost I multiplied $12.95 by 14 to get $181.30. I then multiplied $181.30 by 2 to get $362.60 which is more money than he can spend.

But if he just wanted to buy 320 tiles and the color is uneven then he could afford it. To get this answer I divided 320 by 12 to get 26 with a remainder. He will then need 27 packages. To find the cost I multiplied 27 by $12.95 to get $349.65 which is less than the money he can spend.

38. 1 m² x 36 gunea pigs
= 36 m²

6 x 6		26 x 1
12 x 3	solutions give	18 x 2
4 x 9		12 x 3
		(…….)

All 36 m² (factor of 36)

Cost: (find perimeter)
6 x 6 → 6 x 4 = $24
12 x 3 → 12 + 12 + 3 + 3 = $30
4 x 9 → 4 + 4 + 9 + 9 = $26
Cheapest: $24 (6m x 6m)

The dimensions of each pen are A. 36m X 1m B. 18m X 2m C. 12m X 3m D. 9m X 4m E. 7.2m X 5m and F.6m 6m The cost of each pen would be A. $74 B.$40 C.$30 D.$26 E.$24.4 and F. $24

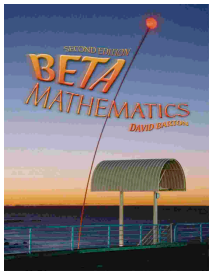
The first thing I thought of were factors of 36 and I came up with a rectangle that the width was 1m and the length was 36m.Then I made a rectangle with the width of 2m and the length 18m.The cost of the second rectangle was cheaper than the first one. Then I made a rectangle with the width 3m and the length 12m.The cost of the third pen was cheaper than all the rest.

I then thought that as the width gets bigger, the cost gets cheaper. To prove my theory I made a rectangle with a width of 4m and a length of 9m.This rectangle was cheaper than all the rest. Then I wanted to find the cheapest answer so I made a rectangle with a width of 5m and a length of 7.5m.This rectangle, like the others, was cheaper. When I tried to make a rectangle with a width of 6m the length was 6m too and that was a square. It was a square because when you divide 36 by 6 it equals 6.I first thought that a square was not a rectangle but came to realize that it actually can be, but a rectangle isn't always a square.

I found the cost of the rectangles by finding the perimeter. The perimeter is the cost because each side costs as much as the dimensions of the side, and when you add up the side you have found the perimeter and how much it costs.

Bibliography Information

Teachers attempted to cite the sources for the problems included in this problem set. In some cases, sources may not have been known.

Problems	Bibliography Information	
32 - 38	The Math Forum @ Drexel (http://mathforum.org/)	
2 - 3, 14 - 17	Barton, David. Beta Mathematics. Pearson Education New Zealand.	
28 - 31	Zaccaro, Edward. Real World Algebra: Hickory Grove Press, 2001.