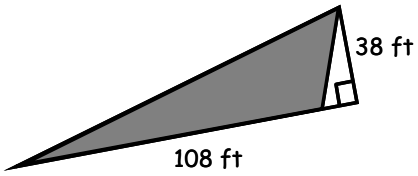
**Green – Area, Parallelogram, Triangle**

**In Exercises 1 – 2, use the following information. The area of a wing of an airplane can be approximated by finding the area of a triangle.**



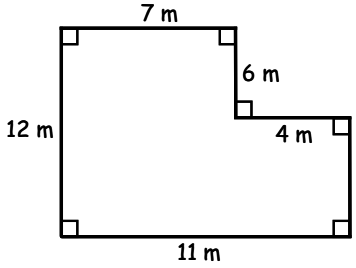

1. Approximate the area of the wing shown.

2. What is the approximate area of both of the wings?

3. A rectangular house is 15 m long. If the area of the house is 345 m², how wide is the house? **(Hint: draw a picture to represent the measurements).**

4. **a.** Add a dashed line to divide this shape into two rectangles.

   **b.** Calculate the area of the whole shape.



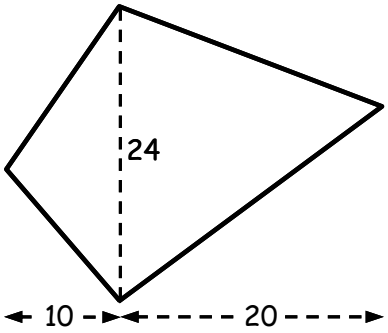

5. A cabbage patch is rectangular in shape, and measures 40 m by 36 m. Avocado trees will be planted on all four boundaries, at least 11 m apart.

   **a.** Calculate the perimeter of the patch.

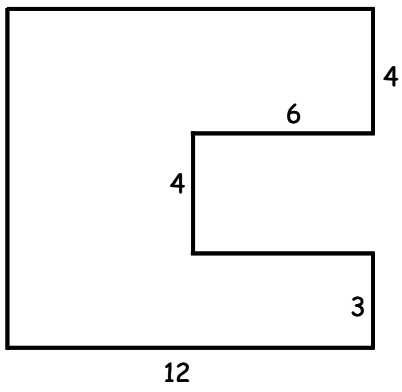
   **b.** What is the largest number of avocado trees that can be planted around the outside?

**Find the area of each shape:**

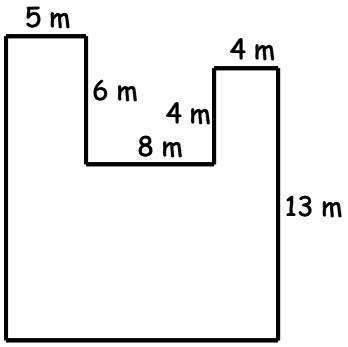
6.




7.



**8.**

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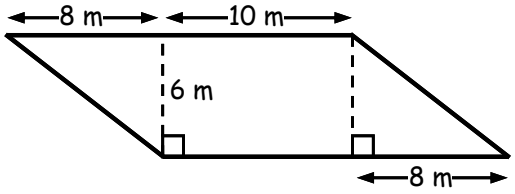
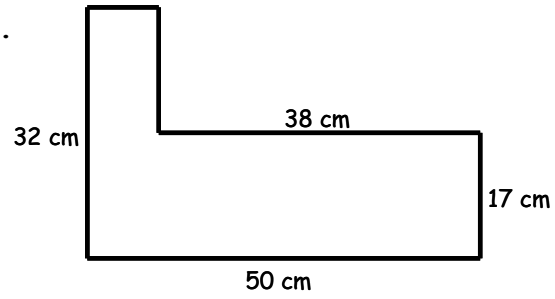
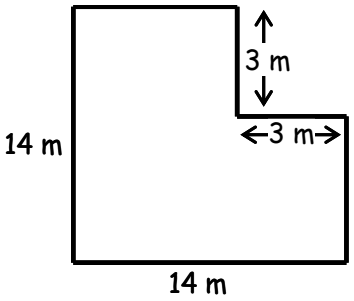


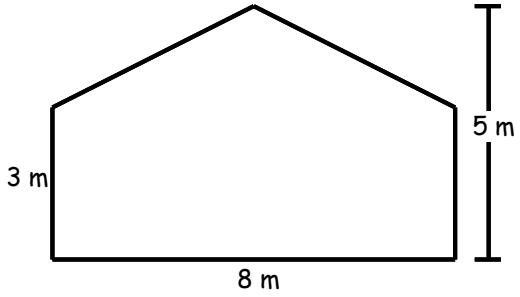

**10.**



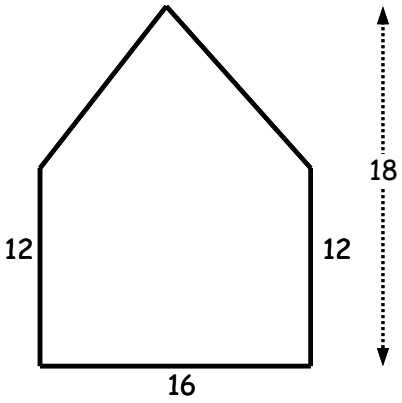

**11.**




**12.**




**13.**




**14.** A reception lounge is rectangular in shape, and measures 20 m by 16 m. In the center of the floor a rectangle measuring 6 m by 5 m has been tiled for dancing. The rest of the floor is carpeted. Calculate the area of carpet.

**15.** A chocolate bar is wrapped in a rectangular piece of foil measuring 10 cm by 15 cm.

**a.** Calculate the area of the piece of foil.

**b.** How many pieces could be cut out from a larger sheet of foil measuring 120 cm by 75 cm?

**16.** DLE envelopes measure 22 cm by 11 cm. Which of the following is most likely to be the area of paper needed to make one of these envelopes? Explain.

**a.** 242 cm²

**b.** 282 cm²

**c.** 484 cm²

**d.** 524 cm²

**17.** A rectangular swimming pool has an area of 800 m² and a width of 16 m. Calculate the length of the pool.

**18.** A farmer uses some fencing to construct a square pen to hold sheep for a competition. The area of the pen is 256 m². What length of fencing will be needed to construct the pen?

**19. Rabbit's Run**

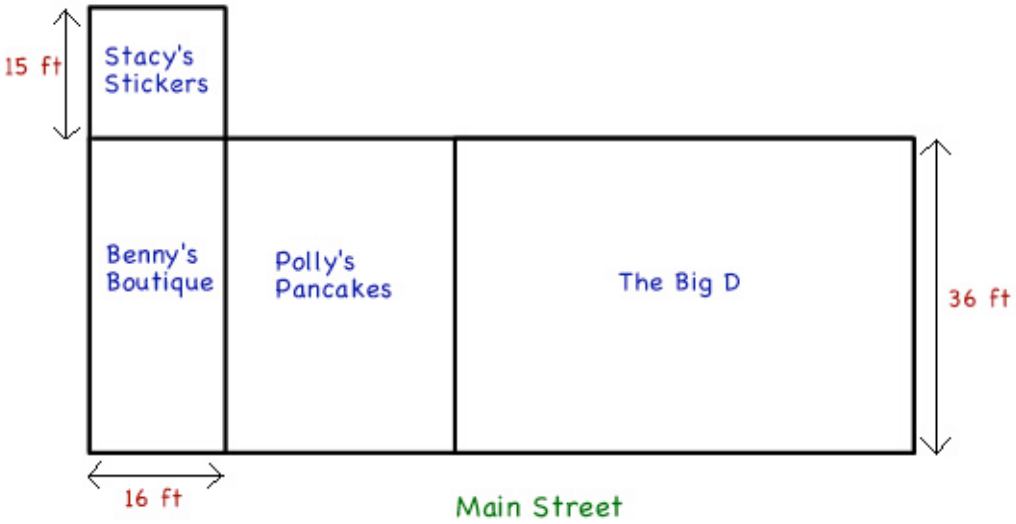
Regina has received a pet rabbit from her neighbor Rodney, who is about to move to an apartment that does not allow pets. Her father is going to help her build a run for the rabbit in their back yard, but he wants Regina to design it.

Regina sits down to think about the possibilities. Her father says the run must be rectangular, with whole number dimensions. If they want to enclose 48 square feet, how many options do they have?

Bonus: Which option should Regina choose in order to make the least expensive run?

**20. Mini-Mall Measurements**

Our town has a new mini-mall on Main Street. This floor plan of the four businesses shows some of the dimensions.




What is the floor area of Stacy's Stickers?

The floor of the department store, The Big D, has been completely covered with 1944 square tiles (1 ft by 1ft). What is the length of The Big D's store front on Main Street?

Extra: Polly's Pancakes has exactly half the floor space that The Big D has. Their floor is also covered with 1 foot square tiles. Only the tiles touching the walls are green. How many tiles are part of the green border?

**Solutions**

**1.** $\frac{1}{2} \times 38 \times 108 = 2052 \text{ ft}^2$

**2.** $2052 \text{ ft}^2 \times 2 = 4104 \text{ ft}^2$

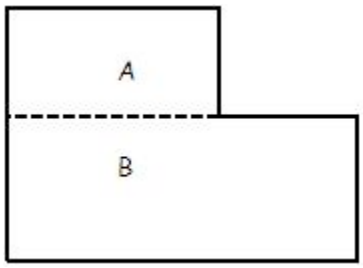
**3.** $15 \text{ m} \square \_\_\_\_ = 345 \text{ m}^2$

$15 \square \ n = 345$

$n = \frac{345}{15}$

$n = 23 \text{ m}$

**4. a.**




**b.** $7 \times 5 = 42 \text{ m}^2$

$11 \times (12 - 6) = 66 \text{ m}^2$

$42 + 66 = 108 \text{ m}^2$

**5. a.** $(40 \times 2) + (36 + 2)$

$80 + 72$

$= 152 \text{ cm}$

**b.** $152 : 11 = 13.8$

Since avocado threes have to be whole numbers there are 13 trees

**6.** $(\frac{1}{2} \times 24 \times 10) + (\frac{1}{2} \times 20 \times 24)$

$120 + 240$

$= 360 \text{ unit}^2$

**7.** $(6 \times 4) + (6 \times 3) + ((12 - 6) \times (4 + 4 + 3))$

$24 + 18 + 66$

$= 108 \text{ unit}^2$

**8.** $(5 \times 6) + (4 \times 4) + ((13 - 4) \times (5 + 8 + 4))$

$30 + 16 + 153$

$= 199 \text{ m}^2$

**9.** $(\frac{1}{2} \times 8 \times 6) + (20 \times 6) + (\frac{1}{2} \times 8 \times 6)$

$= 108 \text{ m}^2$

**10.** $(17 \times 50) + ((32 - 17) \times (50 - 38))$

$850 + 180$

$= 1030 \text{ cm}^2$

**11.** $(14 \times 14) - (3 \times 3)$

$196 - 9$

$= 187 \text{ m}^2$

**12.** $(\frac{1}{2} \times (5 - 3) \times (8)) + ( 3 \times 8)$

$8 + 24$

$= 32 \text{ m}^2$

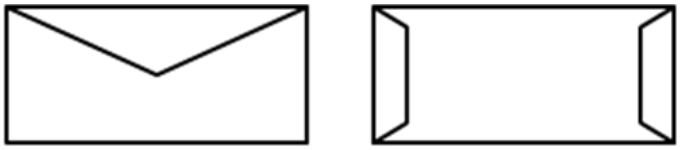
**13.** (16 x 12) + ($\frac{1}{2}$ x 16 x (18 – 12))
192 + 48
= 240 unit²

**14.** (20 x 16) – (6 x 5)
320 - 30
= 290 m²

**15.** **a.** 10 x 15
= 150 cm²

**b.** 120 x 75 = 9000
9000 : 150 = 60

**16.** 22 x 11 = 242
Anything bigger than 242 cm², but an envelope looks like



Front Back

242 x 2 = 484 + (flaps etc.)
# has to be bigger than 484
hence, D = 524 cm²

**17.** 16 x *n* = 800
*n* = 800 : 16
*n* =50 m

**18.** Square
n □ *n* = 256
$\sqrt{256}$ = 16 m

**19.** 48 ft²
= 24 x 2
= 16 x 3
= 4 x 12
= 6 x 8
= 48 x 1
} 5 different choices

**Bonus**: Find one with the least perimeter (less enclosure material to buy)

| | | |
|---|---|---|
| 24 x 2 = 52 cm | 4 x 12 = 32 cm | 48 x 1 = 98 cm |
| 16 x 3 = 38 cm | 6 x 8 = 28 cm | 6 x 8 is the least costly |

There are 5 different choices that Regina can choose from.
**Bonus**: The least expensive run Regina could build is a 6 x 8 run. The 5 different choices are a 1 x 48 run, a 2 x 24 run, a 3 x 16 run, a 4 x 12 run, and a 6x8 run. To find out how many possibilities there are, I thought of multiplication problems that equal 48. Then I doubled and halved the factors to get more possibilities. For example, 6 x 8 = 48.

So split 6 in half and double 8 and you get 3 x 16 = 48.

**Bonus**: To find the least expensive possibility, I went through each possibility and figured out how much it would cost. So 1 x 48 would be 98, 2 x 24 would be 52, 3 x 16 would be 38, 4 x 12 would be 32, and 6 x 8 would be 28. So, the least expensive run is a 6 x 8 run.

**20.** Floor area of Stacy's stickers: 15 x 16 = 240 ft²
4

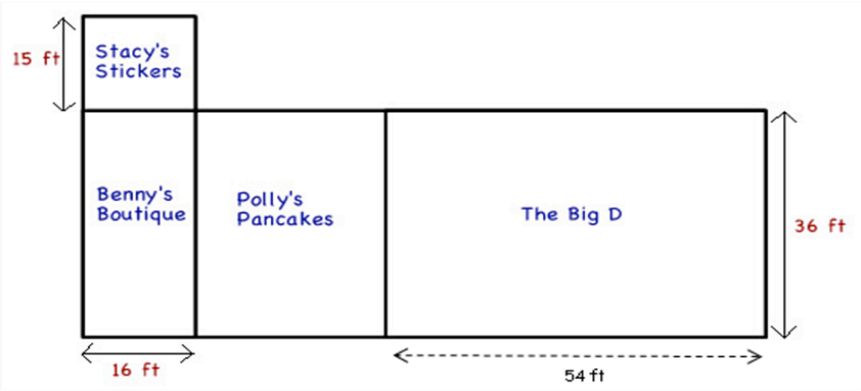
Length of Big D's : 36 x $n$ = 1944

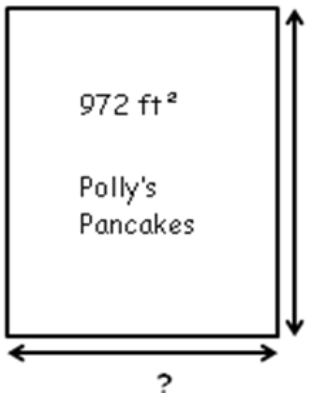
$$n = \frac{1944}{36}$$

$n$ = 54 ft

Polly Pancake: 1944 : 2 = 972
Area 972 ft²

972 tiles



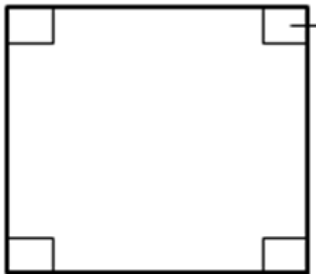




972 = 36 x $n$

$$\frac{972}{36} = n$$

27 ft = $n$

Find perimeter: 27 + 27 + 36 + 36 = 126




126 – 4 = 122 tiles

The floor area of Stacy's Stickers is 240 square feet. The length of The Big D's store front on Main Street is 54 feet. Extra: There are 122 tiles that are part of the green border.

To solve for the floor area of Stacy's Stickers, I noticed that one dimension was labeled 15 feet. I noticed that the other dimension was the same length as the labeled dimension of Benny's Boutique, which was 16 feet. Since area of a rectangle is found by multiplying the length by the width, I multiplied 15 feet x 16 feet. The result was 240 square feet, which was the floor area of Stacy's Stickers.

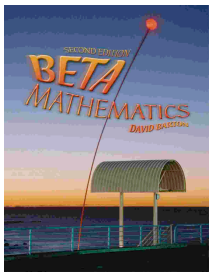
To solve for the length of The Big D's store front on Main Street, I divided 1944 by 36. I knew that if the floor of the store was covered with 1944 square tiles which were 1 foot by 1 foot, then the floor area of the store was 1944 square feet. Since the store was in the shape of a rectangle and area of a rectangle is length multiplied

by width, I divided the area of the store by the width of the store, which was 36 feet. The result was 54 feet, which was the length of the store front on Main Street.

To solve the extra problem asking how many tiles are part of the green border, I divided 1944 by 2 because the area of Polly's Pancakes was exactly half of the Big D, which had an area of 1944. The resulting area for Polly's Pancakes was 972 square feet. I divided 972 by 36 to find the length of Polly's Pancakes store front on Main Street. The answer was 27. Since the dimensions were 27 by 36, I multiplied 2 x 27 and added to that 2 x 36, which gave me the perimeter. The perimeter of the shop was 126. Since the four corners of the store were counted twice, I subtracted 4 from 126 giving me an answer of 122 green tiles.

# 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 | |
|---|---|---|
| 6 - 7, 13, 15 – 18 | Barton, David. Beta Mathematics. Pearson Education New Zealand. |   |
| 19 - 20 | The Math Forum @ Drexel (http://mathforum.org/) | The Math Forum @ Drexel PEOPLE LEARNING MATH TOGETHER |