



Power Up: Math ACT Prep, Week 3

Perimeter and Area





Essential Question

How can I increase my ACT score?



Learning Objectives

- Compute the area and perimeter of a rectangle.
- Apply the understanding of area and perimeter to solve problems.

Collective Brain Dump: Perimeter

Describe how to find the *perimeter* of a rectangle.



Collective Brain Dump: Area

Describe how to find the *area* of a rectangle.

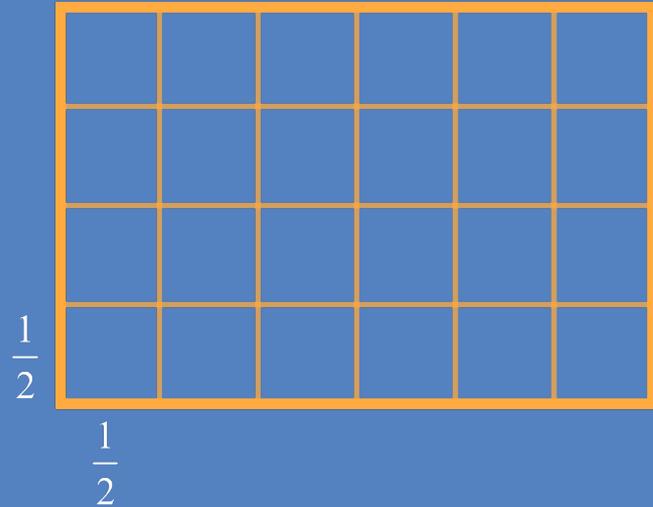
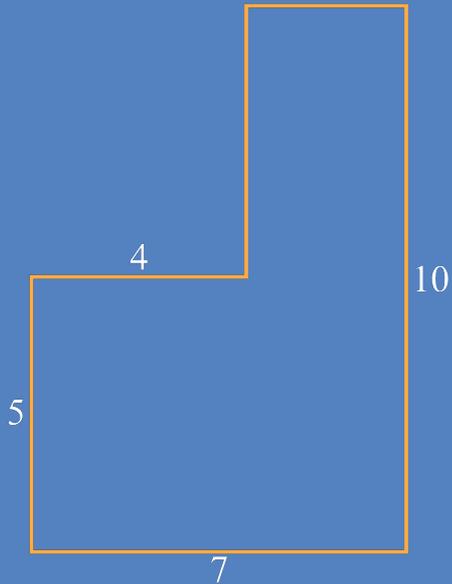


ACT Prep: Questions 1-2

- Work with a partner to solve questions 1-2.
- Use the resources that you think would be helpful.
 - Calculator
 - Graph Paper
 - Coloring Utensils

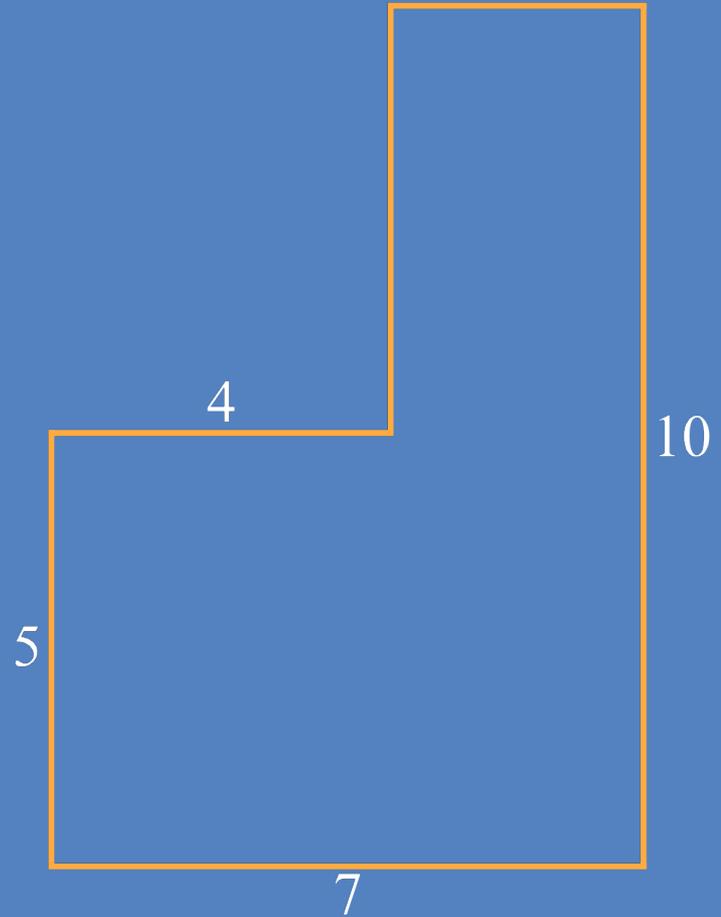
Efficiency

Is there a faster way to approach these problems?



ACT Prep: Question 1

In the following figure, all angles are right angles and the given side lengths are in feet. What is the area, in square feet, of the figure?



ACT Prep: Question 1 (Solution)

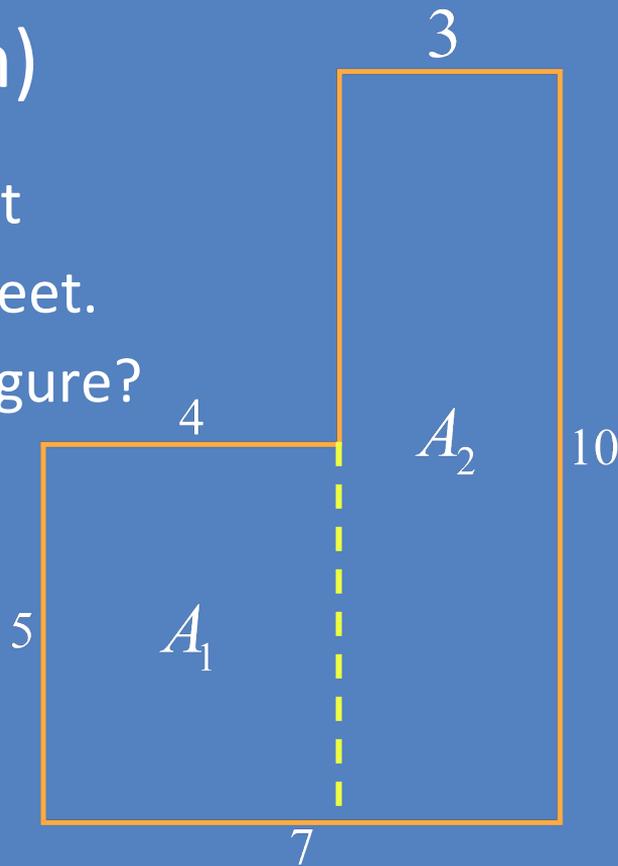
In the following figure, all angles are right angles and the given side lengths are in feet.

What is the area, in square feet, of the figure?

$$A_1 = 4(5) = 20$$

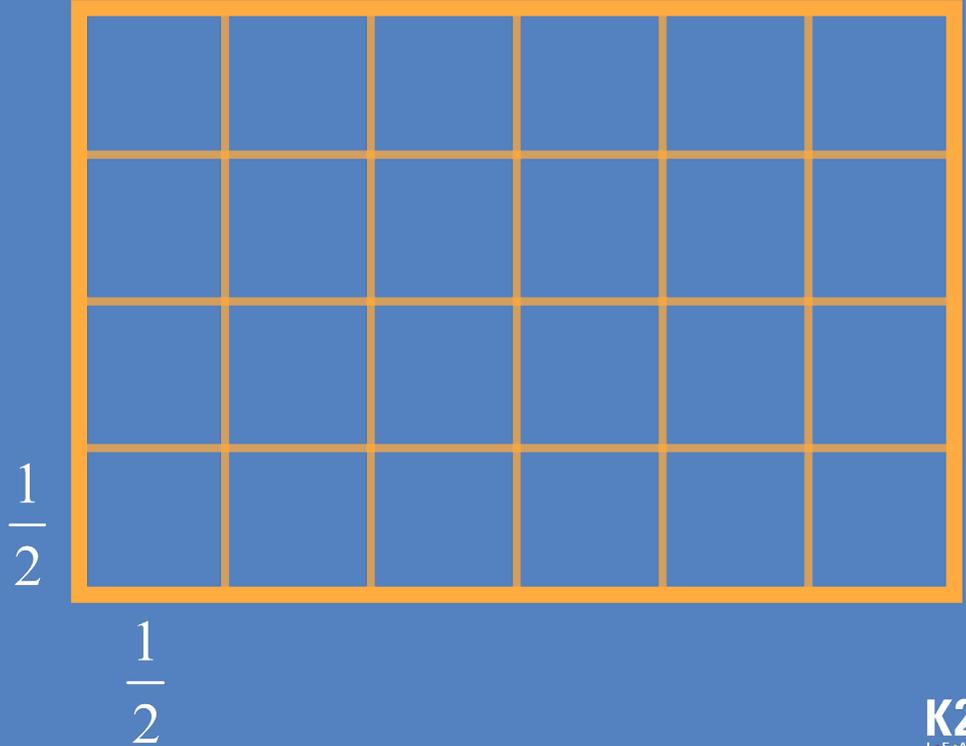
$$A_2 = 3(10) = 30$$

$$\text{Area} = A_1 + A_2 = 50$$



ACT Prep: Question 2

The following rectangle was drawn on a grid of $\frac{1}{2}$ inch by $\frac{1}{2}$ inch squares. Find the perimeter and area of that rectangle.



ACT Prep: Question 2 (Solution)

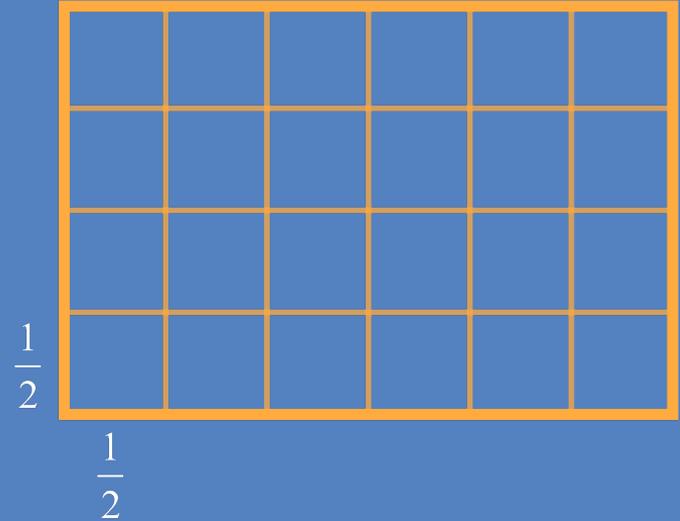
The following rectangle was drawn on a grid of $\frac{1}{2}$ inch by $\frac{1}{2}$ inch squares. Find the perimeter and area of that rectangle.

$$\text{Area} = (\text{Base})(\text{Height})$$

$$A = (3)(2) = 6$$

$$\text{Perimeter} = 2(\text{Base} + \text{Height})$$

$$P = 2(3 + 2) = 10$$



ACT Prep: Questions 3-4

- Apply what you have learned to questions 3-4.
- Remember, you only have 60 seconds per question.



2-Minute Timer

ACT Prep: Question 3

One side of square $KLMN$ has a length of 13 cm. Rectangle $ABCD$ has the same area and a length of 10 cm. What is the width of the rectangle (in centimeters)?

ACT Prep: Question 3 (Solution)

One side of square $KLMN$ has a length of 13 cm. Rectangle $ABCD$ has the same area and a length of 10 cm. What is the width of the rectangle (in centimeters)?

$$A_1 = 13^2 = 169$$

$$A_2 = 10(w)$$

$$A_1 = A_2$$

$$169 = 10w$$

$$16.9 = w$$

ACT Prep: Question 4

A rectangular field is 300 feet long and 150 feet wide. What is the area, in square *yards*, of this field?

ACT Prep: Question 4 (Solution)

A rectangular field is 300 feet long and 150 feet wide. What is the area, in square *yards*, of this field?

$$1 \text{ yard} = 3 \text{ feet}$$

$$l = 300 \text{ ft.} \cdot \frac{1 \text{ yd.}}{3 \text{ ft.}} = 100 \text{ yd.}$$

$$w = 150 \text{ ft.} \cdot \frac{1 \text{ yd.}}{3 \text{ ft.}} = 50 \text{ yd.}$$

$$\begin{aligned} A &= (100 \text{ yards})(50 \text{ yards}) \\ &= \boxed{5,000 \text{ square yards}} \end{aligned}$$

ACT Prep: Question 5

Julio has 44 feet of fencing to enclose a portion of his yard for a pen for his pet pot-bellied pig. What is the area, in square feet, of the largest rectangular region Julio can enclose?

ACT Prep: Question 5 (Solution)

$$P = 2b + 2h$$

$$44 = 2b + 2h$$



$$22 = b + h$$

$$h = 22 - b$$



$$A = b \cdot h$$



$$A = b(22 - b)$$

$$A = 22b - b^2$$

$$A = b(22 - b)$$

$$A = 22b - b^2$$

$$y = -x^2 + 22x$$

ACT Prep: Question 5 (Solution)

- This looks like a **quadratic** equation: $y = -x^2 + 22x$
- Where is the **maximum** of this type of function?
- *vertex*: $x = \frac{-(22)}{2(-1)} = 11$
- So the maximum area is when the side length is 11.
- The maximum area is **121 square feet.**

Exit Ticket

Leave your paper face down until the timer starts.



2-Minute Timer

Exit Ticket (Answers)

1) D

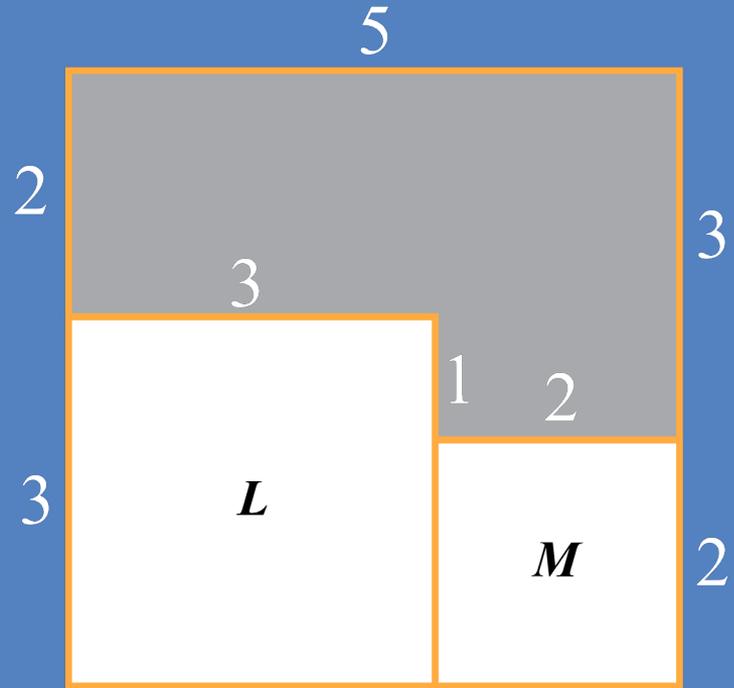
2) G



Exit Ticket (Solution 1)

The outer square in the given figure contains square L and square M . If square L has an area of 9 square units and square M has an area of 4 square units, what is the perimeter of the shaded region?

$$P = 5 + 2 + 3 + 1 + 2 + 3 = 16$$



Exit Ticket (Solution 2)

- The ratio of the perimeters of two squares is 3:4. If the area of the larger square is 400 square feet, what is the length, in feet, of the side of the smaller square?

$$\frac{P_1}{P_2} = \frac{3}{4} = \frac{4x}{4(20)}$$

$$\frac{3}{4} = \frac{x}{20}$$

$$x = 15$$



You Powered Up!

Achievement Unlocked:
Perimeter and Area

