

Name: _____

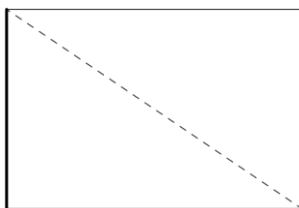
Date: _____

Ratios in the Media

Diagnostic Assessment

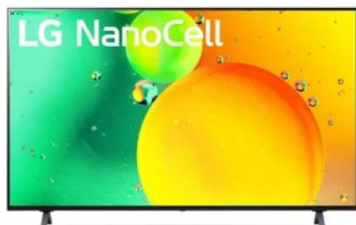
Cutting Corners

Mai and Tyler were standing at one corner of a large rectangular field and decided to race to the opposite corner. Since Mai had a bike and Tyler did not, they thought it would be a fairer race if Mai rode along the sidewalk that surrounds the field while Tyler ran the shorter distance directly across the field. The field is 100 meters long and 80 meters wide. Tyler can run at around 5 meters per second, and Mai can ride her bike at around 7.5 meters per second.



1. Before making any calculations, who do you think will win? By how much? Explain your thinking.
2. Who wins? Show your reasoning.

Engage



1. How many of you have a television in your bedroom?
2. How many televisions do you have in your house?
3. Do you know how televisions are measured? For example, the TV in the above ad is 55”.

Today we will learn how to measure televisions.

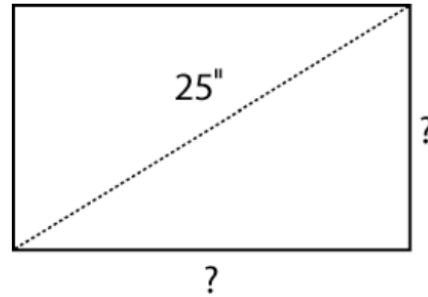
Explore

For a rectangular shape such as a display screen, the longer side is called the width (W) and the shorter side is the height (H). The aspect ratio is W:H or W/H.

1. What is the approximate aspect ratio of the screen on your graphing calculator?
Consider only the window, not the entire screen.

The size of a television is the length of the diagonal of its screen in inches. The aspect ratio of the screens of older televisions is 4:3, while the aspect ratio of newer wide-screen televisions is 16:9.

2. Find the width and height of an older 25-inch television whose screen has an aspect ratio of 4:3.
3. Find the area of this screen.



4. Repeat this process to find the width and height of a newer 48-inch television whose screen has an aspect ratio of 16:9.
5. Determine the area of the screen of a newer 48-inch television whose screen has an aspect ratio of 16:9.

Apply

When movies that were made in one aspect ratio are shown on televisions that have a different aspect ratio, black bars of equal width cover a portion of the screen. Portions of the screen are not needed to project images that were created with different aspect ratios.



Figure 1
4:3 screen displaying a 16:9 image



Figure 2
16:9 screen displaying a 4:3 image

1. Figure 1 shows a letterboxed image with an aspect ratio of 16:9 displayed on a screen with an aspect ratio of 4:3. What percent of the screen's area is occupied by the image? Justify your answer.
2. Some people do not like seeing the letterboxes when watching a 16:9 image on a 4:3 display, as shown in Figure 1. What would happen to the image if it filled the height of the TV?
3. Figure 2 shows a pillarboxed 4:3 image displayed on a 16:9 screen. What percent of the screen's area is occupied by the image? Justify your answer.

People who own a wide-screen television can choose one of three views of a 4:3 image on their display.

- The normal view shows the pillarboxes, as shown in Figure 2.
 - Another option is to stretch the width of the image, keeping the height the same.
 - A third option is to zoom in on the image, making the width of the image take the full width of the display.
4. What effect do these options have on the image?

Now that you understand how to calculate aspect ratios of televisions, let's do some research.

Go online to find the many different sizes of televisions. Fill in the table below for five different televisions.

Advanced Mathematical Decision Making Unit 1
Georgia's K-12 Mathematics Standards

Brand of Television	Size of Television	Length of Television	Width of Television	Area of Television

Now, let's consider movie screens.

5. What's the typical aspect ratio of the screens at a movie theater?
6. What is the length of the movie screen?
7. What is the width of the movie screen?
8. What is the length of the diagonal of the movie screen?
9. What is the area of the movie screen?

Test & Reflect

How does learning about the various uses of aspect ratio affect your buying habits of products with a visual screen?

What types of questions might you ask a sales representative or product help screen online?