

Name: KCV

Date: \_\_\_\_\_

Period: \_\_\_\_\_

Day 10 - Analyzing Numerical Data: Using Ratios

I.B Student Activity Sheet 4: Ratios in the Media

When movies that were made in one aspect ratio are shown on televisions that have a different aspect ratio the picture doesn't match the size of the screen. Black bars of equal width are used to fill in the rest of the screen. Remember back in the old days when you still had a box TV but tried to watch a widescreen movie??

8. Figure 1 shows a letterboxed image of a zebra that has an aspect ratio of 16:9. The image is displayed on a screen that has an aspect ratio of 4:3.

w:h

"widescreen"

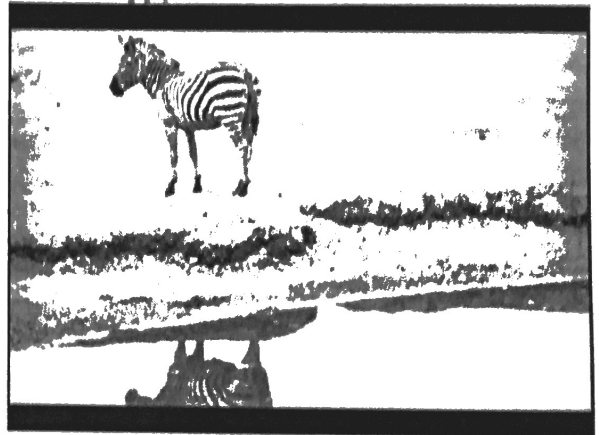


Figure 1  
4:3 screen displaying a 16:9 image

a) What is the aspect ratio of the TV Screen?

4:3

b) What is the aspect ratio of the Image?

16:9

c) Is the height or width different when comparing the tv screen to the image? Can you scale the aspect ratio of the tv screen to make it "match" that of the image (for the side that isn't changed)?

height is different, width is same

(4)3 → (16)12

d) What percent of the screen's area is occupied by the image?

$$\frac{4}{3} = \frac{16}{12} \xrightarrow{\text{same}} \frac{16}{9} \xrightarrow{\times \frac{9}{12} = \frac{3}{4}}$$

screen                      image

$$\frac{3}{4} = 0.75 = 75\% \text{ occupied}$$

9. Some people do not like seeing the letterboxes when watching a 16:9 image on a 4:3 screen. There are two options to get rid of the black boxes.

a) Zoom. The first option is to zoom in so that the picture fills the screen. What does this do to the visible picture?

zoom will cut off the sides

b) Stretch. The other option is to leave the width the same and stretch the height to fill the screen. What does this do to the image?

stretch will distort the image

c) Of the three options (Letterboxed, Zoom, Stretch) which do you prefer and why?

letterboxed because I can deal with the top & bottom being cut off

10. Figure 2 shows a pillarboxed 4:3 image of a peacock displayed on a 16:9 television screen.

a) What is the aspect ratio of the TV Screen?

16:9

b) What is the aspect ratio of the Image?

4:3

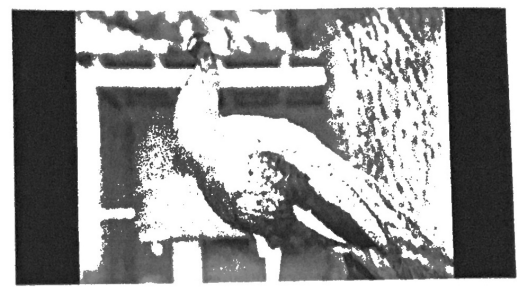


Figure 2  
16:9 screen displaying a 4:3 image

c) Is the height or width different when comparing the tv screen to the image? Can you scale the aspect ratio of the tv screen to make it "match" that of the image (for the side that isn't changed)?

width is different; height is same

$$16:9 \rightarrow \frac{16}{3}:3$$

d) What percent of the screen's area is occupied by the image?

$$\frac{16}{9} = \frac{16}{3} \xrightarrow{\times \frac{3}{4}} \frac{4}{3}$$

screen  $\times \frac{3}{4}$   
same  $\rightarrow$  3

$$\frac{3}{4} = 0.75 = 75\%$$

11. 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 pillarboxed, 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.

a) What affect do these options have on the image?

• Normal View:

sides are cut off

• Stretch the Width:

image is distorted

• Zoom the image:

the tops of the image are cut off

b) Of the three options (Pillarboxed, Zoom, Stretch) which do you prefer and why?

pillarboxed so I can still see the full image