Mirror, Mirror, on the wall…

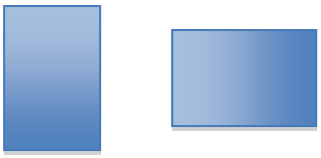
Does backing away from a wall mirror allow you to see more of yourself?

(Adapted from http://www.figurethis.org/challenges/c09/challenge.htm)

Investigation Brief:

Mirrors involve angles, lines, triangles and reflection. Ever wonder how you can see something in a mirror that is larger than the area of the mirror itself? What sort of relationship is there between the size of the mirror and the amount the viewer can see?

1. Mark lines on the floor 30cm, 1m, and 2m away from the wall.
2. Place a rectangular mirror on the flat wall in a portrait orientation so that when you stand on your 30 cm mark, the top of your head is reflected at the top of the mirror.
3. Measure the length of the mirror. Record this.
4. Stand on each of your marks and measure how much of your body (from top of head down) is reflected. Record your measurements.
5. Now repeat but turn your mirror to a landscape orientation. Measure the length of the reflection and position it so the top of your head is reflected at the top of the mirror. Record your observations.



What general statement about the ratio between size of mirror and amount of reflected image can you make based on these 3 distance observations in each of the 2 different perspective mirrors?

Draw a cartoon that represents you standing in front of the mirror and what part of yourself you can see in the mirror up close and further away.

Now devise a further test of your ratio statement to see if it holds true in other situations.

Resources:

- rectangular mirror
- string
- blutac or tape
- measuring tape
- protractor

Prompts and Suggestions:

What would happen to how much you could see of your body reflected if you wore a tall hat and had the top of the hat line up with the top of the mirror?

What applications could there be for what you have discovered?

Is this true or false: the further you are away from a mirror the more you can see reflected?

Try the same experiment with very small or a very large mirror.

How do fun-house mirrors work? Will curve affect the area reflected?

Images and Links:

Look carefully at the lines and angles in the following cartoon. What is the relationship between the mirror and the reflection?

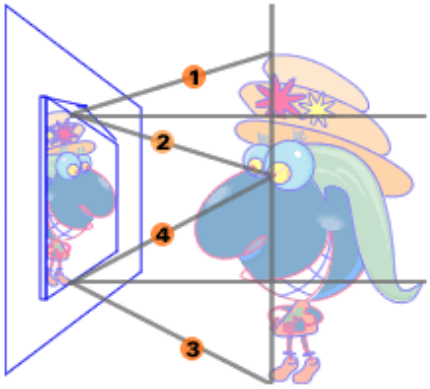


Image accessed from from: http://www.figurethis.org/challenges/c09/answer.htm