

Mirror Geometry

The first non-obvious theorem [in a traditional geometry course] is “The line joining the midpoints of two sides of a triangle is not only parallel to the third side (easy to see), but also equal to half of it.”

Of course, a good teacher can make this obvious without “proof”. Good teaching is largely the art of making things obvious—which is why that word doesn’t mean much in the classroom.

For this theorem, I usually have the kids trace the outline of their face in a mirror (with soap, not lipstick!) and explain why it’s half size. Then you can motivate the proof. I used to ask them to go home and experiment—they never did.

Prequel

Visualise yourself looking in a mirror.

1. Is the image of your face in the mirror
 - A. smaller than your face?
 - B. the same size as your face?
 - C. larger than your face?

2. As you back away from the mirror, does the image of your face become
 - A. larger?
 - B. stay the same size?
 - C. become smaller?

At home tonight, stand at arm’s length from the mirror and outline your face using a bar of soap. Now walk towards and away from the mirror. Were your answers to the questions correct?

Explain the correct answers. Drawing diagrams may help.

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Why does a mirror exchange left and right, but not bottom and top?

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