RESOURCE

Understand Golf Simulator Screen and Projector Math

Screen and projector planning for a golf simulator comes down to a small number of genuinely simple equations, but golfers new to the process often skip understanding them and go straight to a calculator, which makes an unexpected result hard to interpret. This resource walks through the underlying math itself, so the numbers the site's tools produce make sense rather than feeling like a black box.

Width, height, and aspect ratio

An aspect ratio, such as 16:9, fixes the proportion between a screen's width and height. Given a width, you find height by multiplying width by the ratio's height term and dividing by its width term: height equals width times 9 divided by 16, for a 16:9 ratio. Given a height instead, you invert the calculation: width equals height times 16 divided by 9. This is the entire basis of the screen planner, and it is worth internalizing because it explains why choosing a slightly different aspect ratio changes both dimensions, not just one.

Why screen and image dimensions can differ

A screen product's overall enclosure or frame size is not always identical to its active, projectable image area; some products have a visible border outside the image, and the marketed "diagonal" size sometimes refers to the frame rather than the picture. Always check a specific product's stated active image dimensions, not just its advertised size, before treating a calculated width or height as the number to buy against.

Throw ratio and throw distance

A projector's throw ratio relates its distance from the screen to the resulting image width: throw distance equals image width multiplied by the throw ratio. A projector with a throw ratio of 1.2 aimed at a 100-inch-wide image needs to sit 120 inches from the screen along the projection axis.

A zoom lens gives a range of ratios rather than one fixed value, which is why the projector throw planner asks for a minimum and maximum ratio and returns a distance interval rather than a single number.

Lumens per area as a comparison, not a promise

A projector's light output, measured in lumens, spreads across whatever image area you project onto. Dividing lumens by image area gives a nominal illuminance figure that is useful for comparing scenarios against each other (a bigger image with the same projector is nominally dimmer) but is explicitly not a calibrated brightness measurement. Real perceived brightness also depends on screen gain, room surface reflectivity, and ambient light, none of which this simple division accounts for. The brightness comparison tool uses this ratio only to rank your own entered scenarios relative to each other, never against a fixed threshold.

Unit discipline throughout

Every equation here requires consistent units: if your screen width is in inches, your throw ratio calculation produces inches; if you switch to feet partway through, every downstream number becomes wrong by a factor of twelve. Pick one unit before you start measuring and stay with it across every tool on this site for a single project.

A worked example, start to finish

Suppose your opening allows a 105-inch-wide image at 16:9. Height works out to 105 times 9 divided by 16, or about 59 inches. A projector with a throw ratio range of 1.2 to 1.5 would need to sit between 126 and 158 inches from the screen. If your projector has a light output of 3,000 lumens, the nominal illuminance for this image (105 by 59 inches, or about 6,195 square inches) works out to roughly 0.48 lumens per square inch, a number that is only meaningful when compared against a different candidate image size using the same projector.

QUANTITY	FORMULA	EXAMPLE RESULT
Image height from width	width × (ratio height ÷ ratio width)	105 × 9 ÷ 16 ≈ 59"
Throw distance	image width × throw ratio	105 × 1.2 to 1.5 = 126"–158"
Nominal illuminance	lumens ÷ image area	3000 ÷ 6195 ≈ 0.48

What is never inferred here

This resource and its related tools never infer a specific model's optics, a screen material's real gain, your room's surface reflectivity, or your ambient light level. Those factors matter for how an image actually looks, but they require product-specific data and in-room observation this site does not have. Use these equations to plan realistic candidates, then verify the final result in your own room before committing to a purchase. See the impact zone planner next to reserve the right buffer space around whatever screen size you land on.