



$$x = \frac{1}{\tan(45^\circ)}$$

Part One :

$$n = \frac{20}{x} = 20$$

n is even, so ray is in the middle of corridor,
i.e 1 meter from either wall or in line with the source.

Part Two :

By considering path of ray somewhat similar in sine curve. (Can we call it sin ray? :)

Distance between two points in path of ray that are in - phase = $4 \times \text{i.e } 4 \cot (\theta) = 4 \cot (45^\circ) = 4$

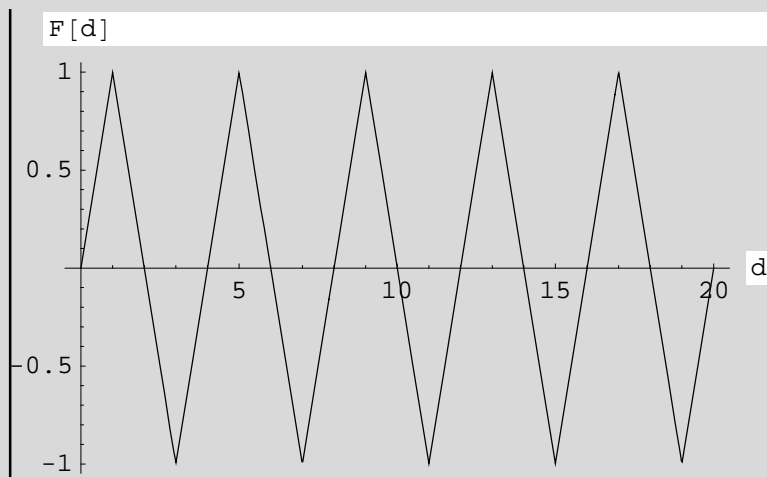
Vertical displacement from source is found by multiplying the offset by $\tan (\theta)$

The position of light ray can be expressed as function of d , the distance of screen from light source as follows :

$$F[d] = | 2 - |d - 1| \bmod 4 | - 1$$

mod is used to find the offset or phase difference at d . Since the ray path repeats in a cycle. (for crunching purposes :)

Here is graph of $F[d]$:



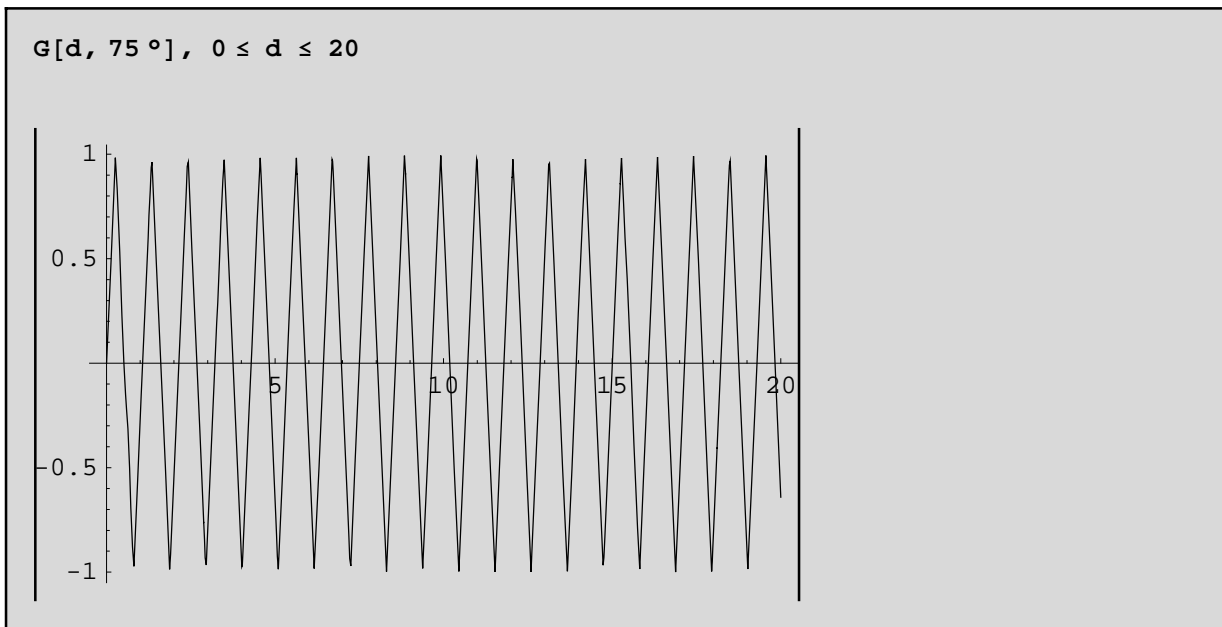
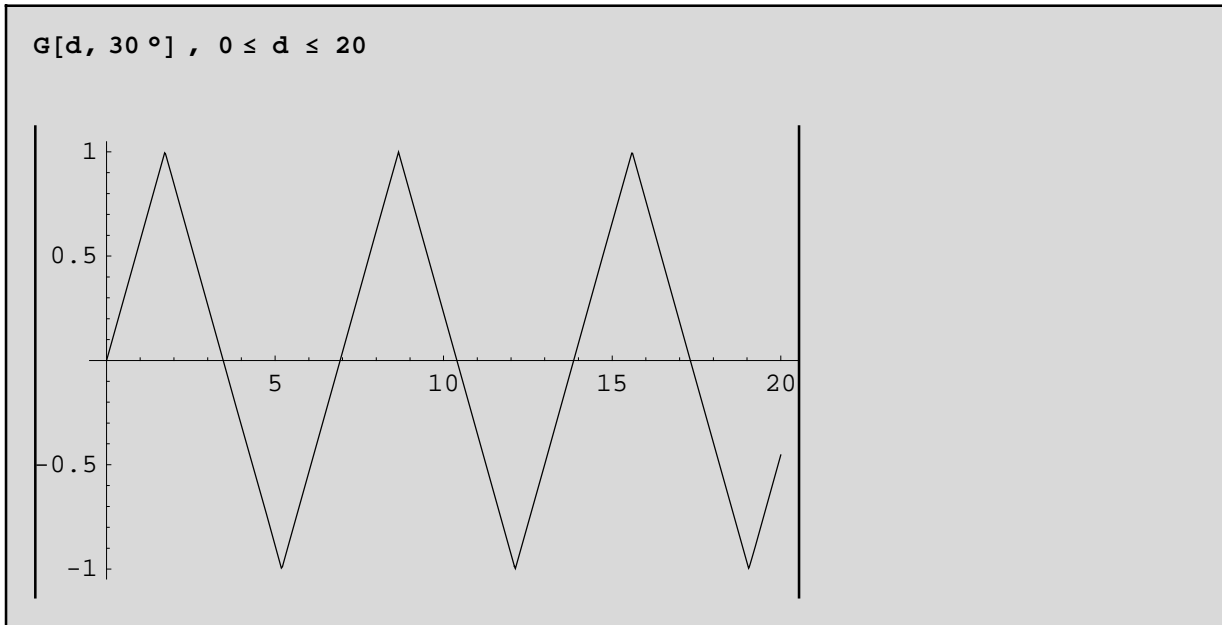
Part Three :

This is simply generalised model of part one where numerical value of angle is replaced by θ

$$G[d, \theta] = | 2 - (|d - \cot (\theta) | \bmod (4 \cot (\theta))) \tan (\theta) | - 1$$

Below are the graphs for different values of θ but same d .

Point to note is that for same d , decreasing the θ will reduce number of reflections and vice - versa.



The Draw operation fails when $\theta = 0^\circ$ and 90° . This was expected since at these extreme values the ray is parallel and perpendicular to the wall.

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