5 Problem Solutions

Problem 5.1

The solutions to (a), (b), and (c) are shown in Fig. P5.1, from left to right:

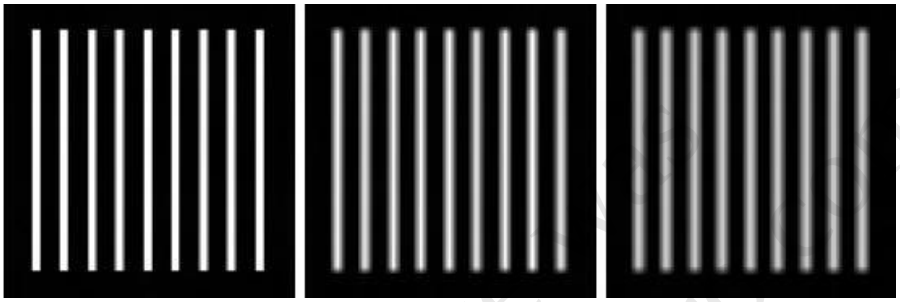

Figure P5.1

Problem 5.2

The solutions to (a), (b), and (c) are shown in Fig. P5.2, from left to right:

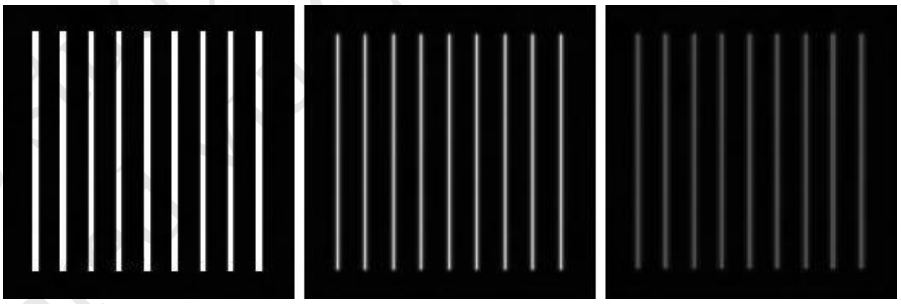

Figure P5.2

5.3

The solutions to (a), (b), and (c) are shown in Fig. P5.3, from left to right:

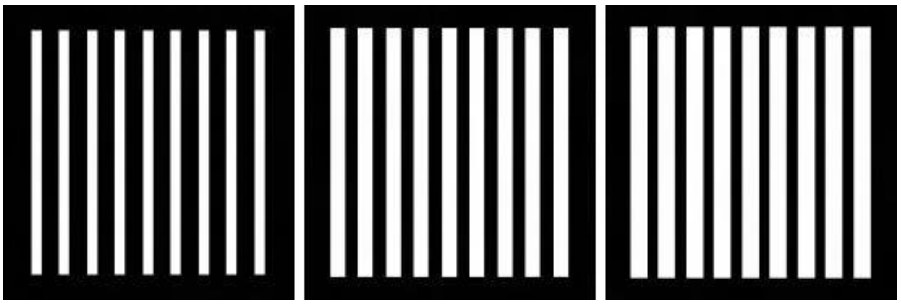

Figure P5.3

Problem 5.4

The solutions to (a), (b), and (c) are shown in Fig. P5.4, from left to right:

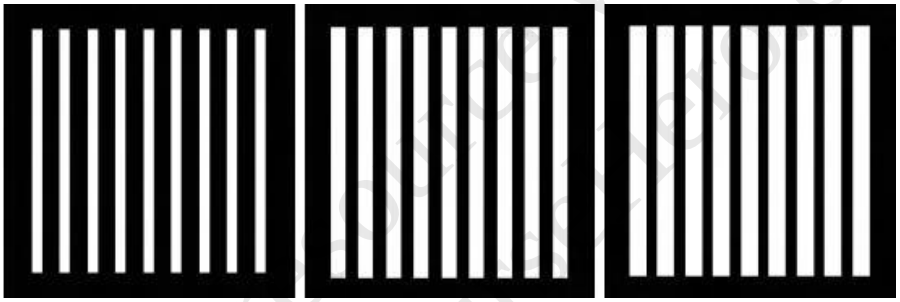

Figure P5.4

Problem 5.5

The solutions to (a), (b), and (c) are shown in Fig. P5.5, from left to right:

Problem 5.6

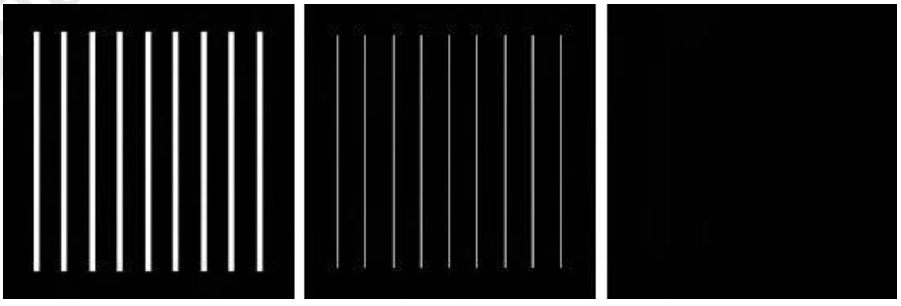

Figure P5.5

Problem 5.6

The solutions to (a), (b), and (c) are shown in Fig. P5.6, from left to right:

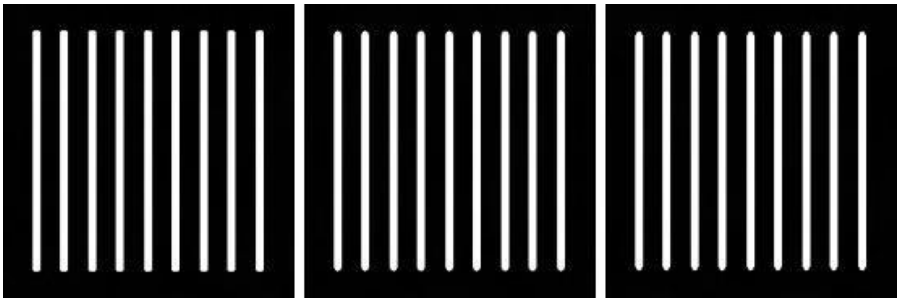

Figure P5.6

Problem 5.7

The solutions to (a), (b), and (c) are shown in Fig. P5.7, from left to right:

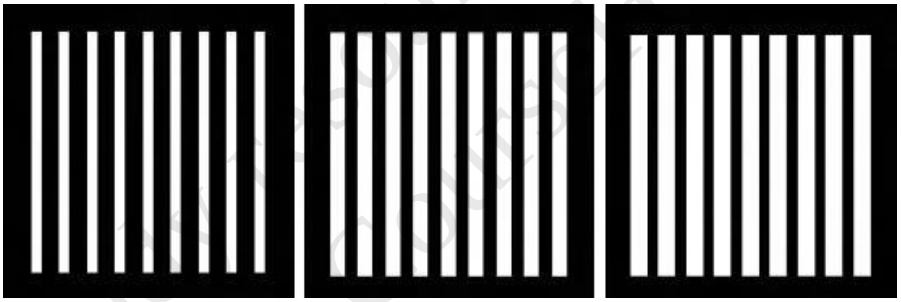

Figure P5.7

5.8

The solutions to (a), (b), and (c) are shown in Fig. P5.8, from left to right:

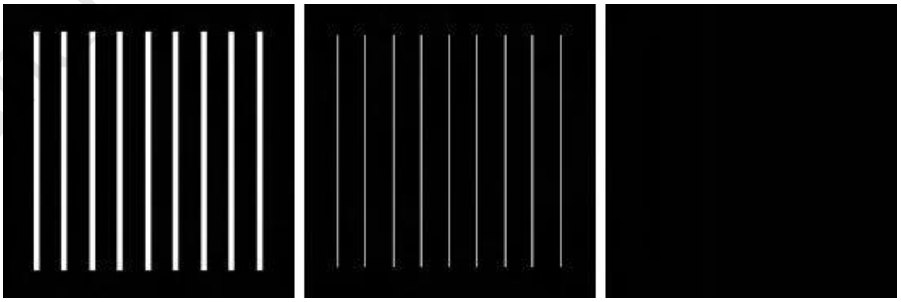

Figure P5.8

Problem 5.9

The solutions to (a), (b), and (c) are shown in Fig. P5.9, from left to right:

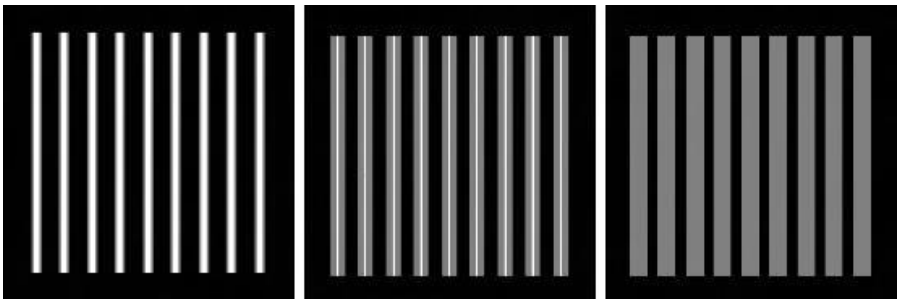

Figure P5.9

Problem 5.10

(a) The key to this problem is that the geometric mean is zero whenever any pixel is zero. Draw a profile of an ideal edge with a few points valued 0 and a few points valued 1. The geometric mean will give only values of 0 and 1, whereas the arithmetic mean will give intermediate values (blur).

(b) Black is 0, so the geometric mean will return values of 0 as long as at l east one pixel in the window is black. Since the center of the mask can be o utside the original black area when this happens, the figure will be thickened.