```
0;

function x = solvetridiagonal(b, d1, d2, d3)
  % n is the length of the center diagonal
  n = length(d2)

  % Scan down to reduce the lower diagonal to zero and the pivots to 1.
  for i = 1:n
    % Rescale the row so the pivot is 1.
    a = d2(i);
    d2(i) /= a;
    if i < n
      d3(i) /= a;
    end
    b(i) /= a;

    % Cancel out all non zero elements in the column except for the pivot.
    if i < n
      factor = -d1(i);
      d1(i) += factor;
      d2(i+1) += factor * d3(i);
      b(i+1) += factor * b(i);
    end
  end

  % Scan back upwards and reduce the upper diagonal to zero and thus solving for x.
  for i = flip(2:n)
    factor = -d3(i-1);
    d3(i-1) += factor;
    b(i-1) += factor * b(i);
  end

  % Finally set x = b
  x = b;
end

% 2.a

n = 10000
% construct the 3 diagaonals
d1 = - (2:n);
d2 = 3 * (1:n);
d3 = - (1:n-1);
% pick b to be something
b = 1:n;

%x = solvetridiagonal(b, d1, d2, d3)

% 2.b

function gt = g(t)
  gt = (pi/2)^2*sin(pi/2 * t)
end

n = 100
h = 1/n

d1 = repmat(-1/h^2, 1, n-1)
d2 = repmat(2/h^2, 1, n)
d3 = repmat(-1/h^2, 1, n-1)
b = g((1:n) * h)

v = solvetridiagonal(b, d1, d2, d3)

u = sin(pi/2 * (1:n) * h)

norm(v-u, inf)
```