(a) Since an `int` requires 2 bytes, the space needed by the array `matrix[10][100]` is $2 * 10 * 100 = 2000$ bytes.

(b) Since a `double` requires 8 bytes, the space needed by the array `x[100][5][20]` is $8 * 100 * 5 * 20 = 80000$ bytes.

(c) Since a `long double` requires 10 bytes, the space needed by the array `y[3]` is $10 * 3 = 30$ bytes.

(d) Since a `float` requires 2 bytes, the space needed by the array `z[10][10][10][5]` is $4 * 10 * 10 * 10 * 5 = 20000$ bytes.

(e) Since a `short` requires 2 bytes, the space needed by the array `a[2][3][4]` is $2 * 2 * 3 * 4 = 48$ bytes.

(f) Since a `long double` requires 10 bytes, the space needed by the array `b[3][3][3][3]` is $10 * 3 * 3 * 3 * 3 = 810$ bytes.