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<< LinearAlgebra`GaussianElimination`
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<< DiscreteMath`Combinatorica`
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```
HDS = Import["C:\FruitJuiceData\HDS58ThreeScores.txt", "Table"]
```

```
{ {3.46792, -0.4184, 0.14956}, {2.6878, 0.03638, -0.90243},
  {2.22352, -0.96181, -0.50653}, {1.22042, -1.66639, -0.31477},
  {1.93336, -1.25065, -0.46865}, {2.14273, -1.88236, 0.88772},
  {0.78093, -0.97976, -0.59153}, {-0.13922, -0.53418, 0.45371},
  {-1.8084, -0.85716, 1.44499}, {-0.78023, 1.2457, 0.44562},
  {-0.89167, 0.61274, 0.53181}, {-3.91192, -0.39028, -2.08062},
  {-3.36732, -1.07574, -0.71212}, {-4.12941, -1.0816, -0.76328},
  {-3.98326, -0.43421, -2.2158}, {1.69646, -1.67391, -0.48341},
  {2.53893, 1.38633, -1.20462}, {2.55311, 1.06623, -0.94857},
  {3.41195, 0.643, -0.88495}, {1.98358, -1.09254, 0.1467}, {3.79083, 0.53323, -1.22438},
  {3.0921, 3.60501, 0.13136}, {0.75395, 1.86733, 0.07075}, {0.23564, -2.00509, 0.89554},
  {0.23232, 4.82085, 1.02485}, {-0.23225, -0.27314, 1.44185},
  {-0.92849, 2.3154, 0.93185}, {-2.27088, -0.07306, 1.37107},
  {-2.66321, 0.28243, 1.7855}, {-1.85711, 0.66043, 0.7748},
  {-2.54427, -0.64998, 1.53438}, {-2.5779, 0.11942, 0.39186},
  {-2.13457, 1.48178, -0.33248}, {-2.71887, -0.10865, -1.46873},
  {-2.49429, -1.91268, 0.63664}, {-4.00086, -0.02451, -0.85814},
  {2.51508, -0.909, -0.07053}, {2.06417, -1.73098, 0.5804}, {2.29071, 0.4324, -1.18887},
  {0.64918, -0.1571, 2.289}, {0.87162, 1.28944, 1.38101}, {-1.74798, 0.12536, 0.74157},
  {-3.14314, 2.51097, -1.49619}, {-2.9219, -2.19461, -0.32629},
  {1.08557, -2.62926, 0.69015}, {-0.5061, 0.81301, 1.16942}, {-0.96837, 1.2288, 0.1489},
  {2.54391, -0.00787, -0.44381}, {3.52917, 0.75169, -1.82768},
  {2.80737, -0.75255, -0.81444}, {0.97592, -2.10716, 0.147},
  {0.50745, -0.93399, -0.25876}, {0.79964, 2.16618, 1.02571},
  {-1.72357, -0.30998, -1.87982}, {-2.71192, 0.97669, -1.57141},
  {1.75972, -2.40465, 0.87975}, {0.13202, 0.46315, 1.32094}, {-0.11994, 2.04935, 0.41441}}
```

```
MatrixForm[HDS]
```

```
( 3.46792  -0.4184  0.14956
  2.6878   0.03638 -0.90243
  2.22352 -0.96181 -0.50653
  1.22042 -1.66639 -0.31477
  1.93336 -1.25065 -0.46865
  2.14273 -1.88236  0.88772
  0.78093 -0.97976 -0.59153
 -0.13922 -0.53418  0.45371
 -1.8084  -0.85716  1.44499
 -0.78023  1.2457   0.44562
 -0.89167  0.61274  0.53181
 -3.91192 -0.39028 -2.08062
 -3.36732 -1.07574 -0.71212
 -4.12941 -1.0816  -0.76328
 -3.98326 -0.43421 -2.2158
  1.69646 -1.67391 -0.48341
  2.53893  1.38633 -1.20462
  2.55311  1.06623 -0.94857
  3.41195   0.643  -0.88495
  1.98358 -1.09254  0.1467)
```

3.79083	0.53323	-1.22438
3.0921	3.60501	0.13136
0.75395	1.86733	0.07075
0.23564	-2.00509	0.89554
0.23232	4.82085	1.02485
-0.23225	-0.27314	1.44185
-0.92849	2.3154	0.93185
-2.27088	-0.07306	1.37107
-2.66321	0.28243	1.7855
-1.85711	0.66043	0.7748
-2.54427	-0.64998	1.53438
-2.5779	0.11942	0.39186
-2.13457	1.48178	-0.33248
-2.71887	-0.10865	-1.46873
-2.49429	-1.91268	0.63664
-4.00086	-0.02451	-0.85814
2.51508	-0.909	-0.07053
2.06417	-1.73098	0.5804
2.29071	0.4324	-1.18887
0.64918	-0.1571	2.289
0.87162	1.28944	1.38101
-1.74798	0.12536	0.74157
-3.14314	2.51097	-1.49619
-2.9219	-2.19461	-0.32629
1.08557	-2.62926	0.69015
-0.5061	0.81301	1.16942
-0.96837	1.2288	0.1489
2.54391	-0.00787	-0.44381
3.52917	0.75169	-1.82768
2.80737	-0.75255	-0.81444
0.97592	-2.10716	0.147
0.50745	-0.93399	-0.25876
0.79964	2.16618	1.02571
-1.72357	-0.30998	-1.87982
-2.71192	0.97669	-1.57141
1.75972	-2.40465	0.87975
0.13202	0.46315	1.32094
-0.11994	2.04935	0.41441

```

theSDs = HDS;; Let[t = KSubsets[theSDs, 4]];;
For[j = 1, j < 59, j++, Let[{l, m, n} = Take[theSDs, {j}]];; testpoint = {l, m, n}; ;
totalindic = 0; ; For[i = 1, i < 424271, i++, Let[{x, y, z, w} = Take[t, {i}],
  x =  $\begin{pmatrix} 1 & 1 & 1 & 1 \\ x & y & z & w \end{pmatrix}$ ]; Clear[a, b, c, d]; ; {{a, b, c, d}} = {a, b, c, d} /.
  Solve[{a + b + c + d == 1, a*x + b*y + c*z + d*w == testpoint}, {a, b, c, d}]; ;
  If[{a > 0, b > 0, c > 0, d > 0} == {True, True, True, True},
    {indic = 1, answer = inside}, {indic = 0, answer = outside}]; ;
  totalindic = totalindic + indic; ; SD = totalindic / 424270 ]]; ;
Print["SD", j, " is ", SD, " = ", N[SD]]]; ; f[j] = N[SD]; ;
Export["C:\FruitJuiceData\HDS58PC3.xls",
  {Table[f[k], {k, j - 1}]}, "Table"]

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$$\text{SD1 is } 0 = 0.$$

$$\text{SD2 is } \frac{939}{42427} = 0.0221321$$

$$\text{SD3 is } \frac{5799}{424270} = 0.0136682$$

$$\text{SD4 is } \frac{852}{212135} = 0.00401631$$

$$\text{SD5 is } \frac{4537}{212135} = 0.0213873$$

$$\text{SD6 is } 0 = 0.$$

$$\text{SD7 is } \frac{1433}{42427} = 0.0337757$$

$$\text{SD8 is } \frac{4078}{42427} = 0.096118$$

$$\text{SD9 is } \frac{128}{212135} = 0.000603389$$

$$\text{SD10 is } \frac{17737}{424270} = 0.0418059$$

$$\text{SD11 is } \frac{32377}{424270} = 0.0763123$$

$$\text{SD12 is } \frac{129}{42427} = 0.00304052$$

$$\text{SD13 is } \frac{432}{42427} = 0.0101822$$

$$\text{SD14 is } \frac{1}{212135} = 4.71398 \times 10^{-6}$$

$$\text{SD15 is } \frac{1}{424270} = 2.35699 \times 10^{-6}$$

$$\text{SD16 is } \frac{719}{424270} = 0.00169468$$

$$\text{SD17 is } \frac{50}{6061} = 0.00824946$$

$$\text{SD18 is } \frac{2248}{212135} = 0.010597$$

$$\text{SD19 is } \frac{556}{212135} = 0.00262097$$

$$\text{SD20 is } \frac{8249}{212135} = 0.0388856$$

$$\text{SD21 is } \frac{9}{424270} = 0.0000212129$$

$$\text{SD22 is } \frac{1}{30305} = 0.0000329979$$

$$\text{SD23 is } \frac{951}{38570} = 0.0246565$$

$$\text{SD24 is } \frac{5}{1463} = 0.00341763$$

$$\text{SD25 is } \frac{92}{212135} = 0.000433686$$

$$\text{SD26 is } \frac{719}{60610} = 0.0118627$$

$$\begin{aligned}
\text{SD27 is } \frac{1971}{424270} &= 0.00464563 \\
\text{SD28 is } \frac{1857}{212135} &= 0.00875386 \\
\text{SD29 is } \frac{1}{406} &= 0.00246305 \\
\text{SD30 is } \frac{5721}{424270} &= 0.0134843 \\
\text{SD31 is } \frac{107}{424270} &= 0.000252198 \\
\text{SD32 is } \frac{5399}{424270} &= 0.0127254 \\
\text{SD33 is } \frac{4401}{424270} &= 0.0103731 \\
\text{SD34 is } \frac{6154}{212135} &= 0.0290098 \\
\text{SD35 is } \frac{8}{42427} &= 0.000188559 \\
\text{SD36 is } \frac{9}{60610} &= 0.00014849 \\
\text{SD37 is } \frac{687}{60610} &= 0.0113348 \\
\text{SD38 is } \frac{1378}{212135} &= 0.00649586 \\
\text{SD39 is } \frac{8909}{424270} &= 0.0209984 \\
\text{SD40 is } \frac{9}{14630} &= 0.000615174 \\
\text{SD41 is } \frac{2}{1015} &= 0.00197044 \\
\text{SD42 is } \frac{1791}{42427} &= 0.0422137 \\
\text{SD43 is } \frac{281}{424270} &= 0.000662314 \\
\text{SD44 is } \frac{3}{11165} &= 0.000268697 \\
\text{SD45 is } \frac{6}{19285} &= 0.000311123 \\
\text{SD46 is } \frac{457}{30305} &= 0.01508 \\
\text{SD47 is } \frac{18603}{424270} &= 0.0438471 \\
\text{SD48 is } \frac{6249}{212135} &= 0.0294577 \\
\text{SD49 is } \frac{13}{38570} &= 0.00033705 \\
\text{SD50 is } \frac{183}{424270} &= 0.000431329 \\
\text{SD51 is } \frac{52}{30305} &= 0.00171589 \\
\text{SD52 is } \frac{16804}{212135} &= 0.0792137
\end{aligned}$$

$$\text{SD53 is } \frac{134}{42427} = 0.00315837$$

$$\text{SD54 is } \frac{83}{60610} = 0.00136941$$

$$\text{SD55 is } \frac{127}{42427} = 0.00299338$$

$$\text{SD56 is } \frac{96}{212135} = 0.000452542$$

$$\text{SD57 is } \frac{5993}{424270} = 0.0141254$$

$$\text{SD58 is } \frac{41}{2090} = 0.0196172$$

C:\FruitJuiceData\HDS58PC3.xls