

Задание 1.

Исходные данные:

Случайная непрерывная величина A имеет равномерное распределение на промежутке $(200, 800]$.

Найдите ее среднее значение и дисперсию.

Решение:

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> import math
>>> from math import fsum
>>> a = [200, 300, 400, 500, 600, 700, 800]
>>> math.fsum(a)
3500.0
>>> b = (math.fsum(a)) / 7
>>> print(b)
500.0
>>>
```

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> import math
>>> from math import fsum
>>> a = [(200 - 500) ** 2, (300 - 500) ** 2, (400 - 500) ** 2, (500 - 500) ** 2, (600 - 500) ** 2, (700 - 500) ** 2, (800 - 500) ** 2]
>>> math.fsum(a)
280000.0
>>> b = (math.fsum(a)) / 7
>>> print(b)
40000.0
>>>
>>> c = (math.fsum(a)) / (7 - 1)
>>> print(c)
46666.666666666664
>>>
```

Задание 2.

Исходные данные:

О случайной непрерывной равномерно распределенной величине B известно, что ее дисперсия равна 0.2.

Можно ли найти правую границу величины В и ее среднее значение зная, что левая граница равна 0.5?

Если да, найдите ее.

Решение:

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> import math
```

```
>>> from math import fsum
```

```
>>> a = [0.01, 0.01, 0.5, 0.01, 0.01]
```

```
>>> math.fsum(a)
```

```
0.54
```

```
>>> b = [(0.01 - 0.54) ** 2, (0.01 - 0.54) ** 2, (0.5 - 0.54) ** 2, (0.01 - 0.54) ** 2, (0.01 - 0.54) ** 2]
```

```
>>> math.fsum(b)
```

```
1.12520000000000002
```

```
>>> c = (math.fsum(b)) / (5 - 1)
```

```
>>> print(c)
```

```
0.281300000000000005
```

```
>>> mode = []
```

```
>>> mode.insert(0, 0.5)
```

```
>>> print(mode)
```

```
[0.5]
```

```
>>>
```

Задание 3.

Исходные данные:

Непрерывная случайная величина X распределена нормально и задана плотностью распределения

$$f(x) = (1 / (4 * \sqrt{2 * \pi})) * (\exp(-(x+2)**2) / 32).$$

Найдите:

а). $M(X)$

б). $D(X)$

в). $\text{std}(X)$ (среднее квадратичное отклонение)

Решение:

а). $M(X)$

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

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```
>>> import math
```

```
>>> import numpy as np
```

```
>>> from math import sqrt
```

```
>>> math.sqrt(2)
```

```

1.4142135623730951
>>>
>>> from math import pi
>>> math.pi
3.141592653589793
>>>
>>> a = (math.sqrt(2)) * (math.pi)
>>> x = 1
>>> b = ( - (x + 2)) ** 2
>>> np.exp(b)
8103.083927575384
>>> c = (1 / (4 * a)) * (np.exp(b) / 32)
>>> print(c)
14.24870834216118
>>> m = a + b
>>> print(m)
13.442882938158366
>>>

```

6). D(X)

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```

>>> import math
>>> import numpy as np
>>> from math import sqrt
>>> math.sqrt(2)
1.4142135623730951
>>>
>>> from math import pi
>>> math.pi
3.141592653589793
>>>
>>> a = (math.sqrt(2)) * (math.pi)
>>> x = 1
>>> b = ( - (x + 2)) ** 2
>>> np.exp(b)
8103.083927575384
>>> c = (1 / (4 * a)) * (np.exp(b) / 32)
>>> print(c)
14.24870834216118
>>> d = b - a
>>> print(d)

```

4.557117061841634

>>>

в). $\text{std}(X)$ (среднее квадратичное отклонение)

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

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>>> import math

>>> import numpy as np

>>> from math import sqrt

>>> math.sqrt(2)

1.4142135623730951

>>>

>>> from math import pi

>>> math.pi

3.141592653589793

>>>

>>> a = (math.sqrt(2)) * (math.pi)

>>> x = 1

>>> b = (- (x + 2)) ** 2

>>> np.exp(b)

8103.083927575384

>>>

>>> c = (1 / (4 * a)) * (np.exp(b) / 32)

>>> print(c)

14.24870834216118

>>> q = a ** 2 / a - 1

>>> print(q)

3.442882938158366

>>>

Задание 4.

Исходные данные:

Рост взрослого населения города X имеет нормальное распределение.

Причем, средний рост равен 174 см, а среднее квадратичное отклонение равно 8 см.

Какова вероятность того, что случайным образом выбранный взрослый человек имеет рост:

а). больше 182 см

б). больше 190 см

в). от 166 см до 190 см

г). от 166 см до 182 см

д). от 158 см до 190 см

е). не выше 150 см или не ниже 190 см

ё). не выше 150 см или не ниже 198 см

ж). ниже 166 см.

Решение:

а). больше 182 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> a = [120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137,
138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156,
157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175,
176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194,
195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213,
214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132,
133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151,
152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170,
171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189,
190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208,
209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127,
128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146,
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166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184,
185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203,
204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122,
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142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160,
161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179,
180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198,
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218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136,
137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155,
156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174,
175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193,
194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212,
213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131,
132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150,
151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169,
170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188,
189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207,
208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126,
127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145,
146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164,
165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183,
184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202,
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[illegible]

184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200,
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120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138,
139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157,
158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176,
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153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171,
172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190,
191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209,
210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128,
129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147,
148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166,
167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(182, 220):
```

```
...     print(a)
```

```
...
```

```
182
```

```
183
```

```
184
```

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185
```

```
186
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187
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188
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189
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190
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191
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192
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193
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194
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195
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196
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197
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198
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199
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200
```

```
201
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```
202
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203
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```
204
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205
206
207
208
209
210
211
212
213
214
215
216
217
218
219

```
>>> b = 37 * 34
```

```
>>> print(b)
```

1258

```
>>> c = 1258 / 3364
```

```
>>> print(c)
```

0.37395957193816887

```
>>>
```

б). больше 190 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> a = [120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137,
138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156,
157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175,
176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194,
195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213,
214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132,
133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151,
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171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189,
190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208,
209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127,
128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146,
147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165,
166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184,
185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203,
204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122,
```

[illegible]

[illegible]

[illegible]

193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219

```
>>> b = 30 * 34
```

```
>>> print(b)
```

```
1020
```

```
>>> c = 1020 / 3364
```

```
>>> print(c)
```

```
0.3032104637336504
```

```
>>>
```

в). от 166 см до 190 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> a = [120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137,
138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156,
157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175,
176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194,
```

[illegible]

[illegible]

[illegible]

[illegible]

172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190,
191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209,
210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128,
129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147,
148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166,
167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(166, 191):
```

```
...     print(a)
```

```
...
```

```
166
```

```
167
```

```
168
```

```
169
```

```
170
```

```
171
```

```
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188
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189
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```
190
```

```
>>> b = 25 * 34
```

```
>>> print(b)
```

```
850
```

```
>>>
```

```
>>> c = 850 / 3364
```

```
>>> print(c)
```

```
0.25267538644470866
```

```
>>>
```

г). от 166 см до 182 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

[illegible]

[illegible]

[illegible]

[illegible]

120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138,
139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157,
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196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214,
215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133,
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153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171,
172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190,
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167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(166, 183):
```

```
...     print(a)
```

```
...
```

```
166
```

```
167
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168
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181
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```
182
```

```
>>>
```

```
>>> b = 17 * 34
```

```
>>> print(b)
```

```
578
```

```
>>>
```

```
>>> c = 578 / 3364
```

```
>>> print(c)
```

```
0.1718192627824019
```

[illegible]

[illegible]

[illegible]

[illegible]

201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219,
120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138,
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177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195,
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167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(158, 191):
```

```
...     print(a)
```

```
...
```

```
158
```

```
159
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160
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182
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190

>>>

>>> b = 33 * 34

>>> print(b)

1122

>>>

>>> c = 1122 / 3364

>>> print(c)

0.3335315101070155

>>>

е). не выше 150 см или не ниже 190 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

>>> a = [120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137,
138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156,
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199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

[illegible]


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126
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128
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136
137
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139
140
141
142
143
144
145
146
147
148
149
150
>>>
>>> b = 31 * 34
>>> print(b)
1054
>>> c = 1054 / 3364
>>> print(c)
0.31331747919143876
>>>
>>> for a in range(190, 220):
...     print(a)
...
190
191
192
193
194
195
```

196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
>>>

```
>>> b = 30 * 34
```

```
>>> print(b)
```

1020

```
>>>
```

```
>>> c = 1020 / 3364
```

```
>>> print(c)
```

0.3032104637336504

```
>>>
```

```
>>>
```

ё). не выше 150 см или не ниже 198 см

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> a = [120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137,
138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156,
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176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194,
```

[illegible]

[illegible]

[illegible]

[illegible]

172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190,
191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209,
210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128,
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148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166,
167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(120, 151):
```

```
...     print(a)
```

```
...
```

```
120
```

```
121
```

```
122
```

```
123
```

```
124
```

```
125
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126
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147
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148
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149
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```
150
```

```
>>>
```

```
>>> b = 31 * 34
```

```
>>> print(b)
1054
>>>
>>> c = 1054 / 3364
>>> print(c)
0.31331747919143876
>>>
>>> for a in range(198, 220):
...     print(a)
...
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
>>>
>>> b = 22 * 34
>>> print(b)
748
>>>
>>> c = 748 / 3364
>>> print(c)
0.22235434007134364
>>>
ж). ниже 166 см.
```

[GCC 9.3.0] on linux

[illegible]

[illegible]

[illegible]

[illegible]

139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183]

```
>>> for a in range(120, 167):
```

```
...     print(a)
```

```
...
```

```
120
```

```
121
```

```
122
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123
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162
163
164
165
166
>>> b = 47 * 34
>>> print(b)
1598
>>>
>>> c = 1598 / 3364
>>> print(c)
0.4750297265160523
>>>
```

Задание 5.

Исходные данные:

На сколько сигм (средних квадратичных отклонений) отклоняется рост человека, равный 190 см, от

математического ожидания роста в популяции, в которой $M(X) = 178$ см и $D(X) = 25$ кв.см?

Решение:

Python 3.8.5 (default, May 27 2021, 13:30:53)

[GCC 9.3.0] on linux

Type "help", "copyright", "credits" or "license" for more information.

```
>>> d = 178 ** 2 / 50.613 - 1
>>> print(d)
625.0051765356726
```

```
>>>
>>> d1 = 190 ** 2 / 50.613 - 1
>>> print(d1)
712.2554877205461
>>>
>>> f = d1 / d
>>> print(f)
1.1395993416702423
>>>
```