

Panel 1

Standard Normal Distribution:  $N(0,1)$

z	Second Decimal Place of z									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0722	.0708	.0694	.0681
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
1.8	.0359	.0352	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
2.9	.0019	.0018	.0017	.0017	.0016	.0016	.0015	.0015	.0014	.0014

$X \sim N(\mu, \sigma)$   
 $z = \frac{x - \mu}{\sigma}$

Panel 2

$X$  is  $N(3, 1)$ , find  $P(X \geq 2)$

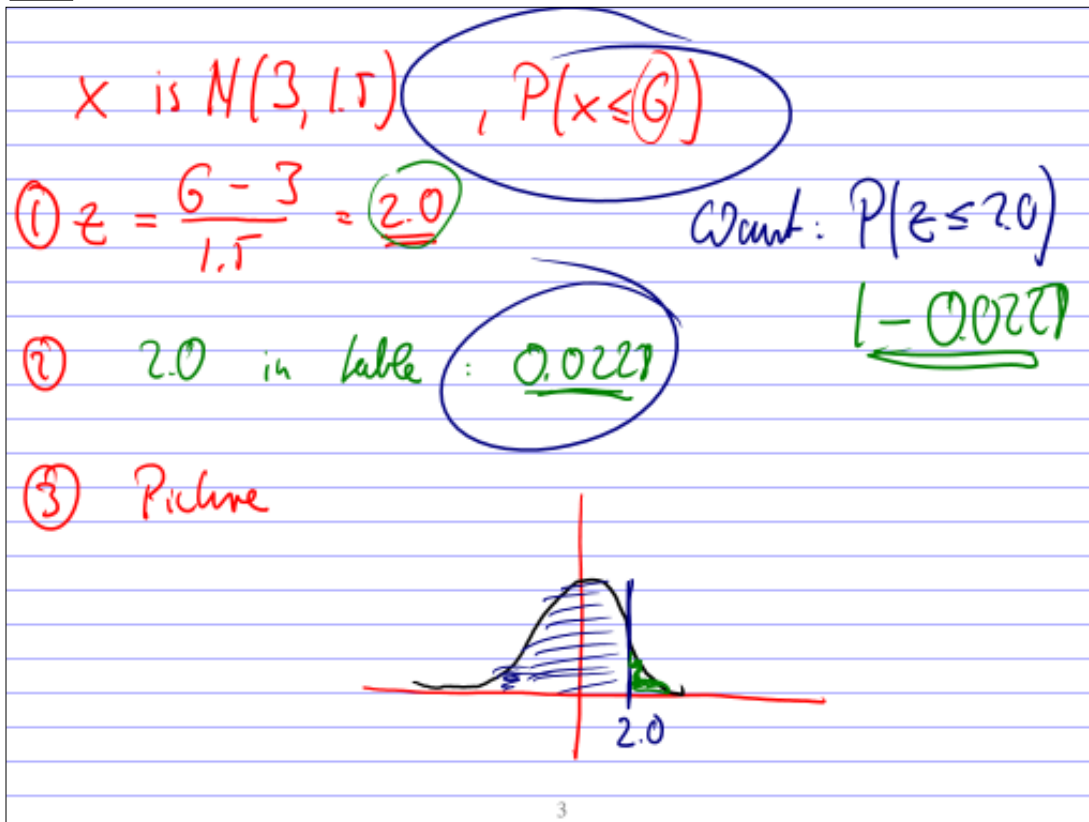
①  $z = \frac{2 - 3}{1} = -1$

$P(X \geq 2) = P(z \geq -1) = 1 - 0.1587 =$

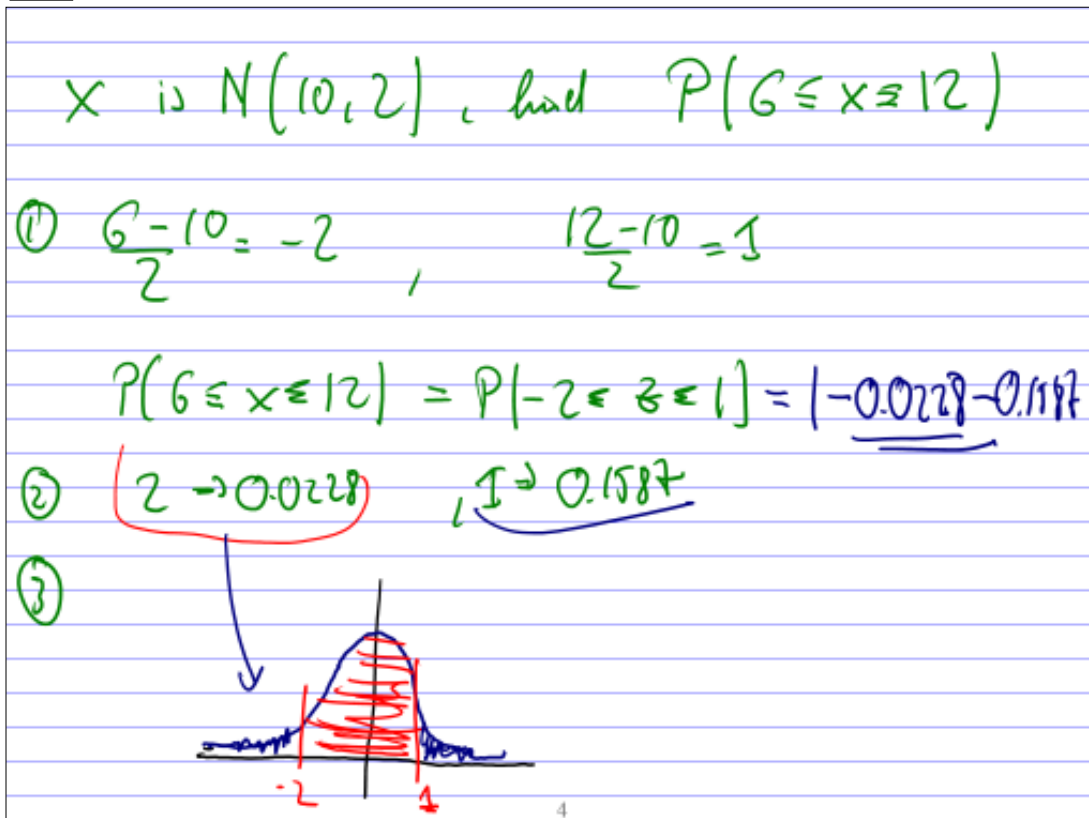
② 1.00 in the table gives 0.1587

③

Panel 3



Panel 4



Panel 5

$$\textcircled{1} X \text{ is } N(3, 2). \text{ Find } P(X \geq 5)$$

$$\textcircled{2} X \text{ is } N(-2, 4). \text{ Find } P(-6 < X < -3)$$

$$\textcircled{3} X \text{ is } N(10, 5). \text{ Find } P(8 < X < 12)$$

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Panel 6

Prob. that a random person is 50 years or older.

$$P(X \geq 50), \quad X \text{ has } \mu = 47.71, \quad \sigma = 17.35$$

$$z = \frac{50 - 47.71}{17.35} = 0.132$$

$$P(Z \geq 0.132) = 0.4483 \text{ or } \underline{44.8\%}$$

$$\downarrow$$

$$0.4483$$

Works if X is Normal

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Panel 7

Central Limit Theorem. Say we have a distribution of unknown shape. If we select samples of size  $N$  at random, and compute sample mean  $\bar{x}$  and std. dev.  $S$ , then those sample means have normal distr.

In fact if original distr. has mean  $\mu$  and std. dev.  $\sigma$ , then  $\bar{x}$  has mean  $\mu$  and std. dev.  $\frac{\sigma}{\sqrt{N}}$ , i.e.  $\bar{x}$  is  $N(\mu, \frac{\sigma}{\sqrt{N}})$

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