

Answer Sheet

1	- 7.64 ✓	14	0.046 ✓
2	0.008 ✓	15	0.106 ✓
3	0.055 ✓	16	0.944 ✓
4	0.992 ✓	17	0.944 ✓
5	0.227 ✓	18	0.539 ✓
6	3.5 ✓	19	70.889% ✓
7	0.0000003 ✓	20	30.59% ✓
8	0.00002 ✓	21	94.189% ✓
9	0.0005 ✓	22	65.069% ✓
10	0.0005 ✓	23	24.589% ✓
11	0.0005 ✓	24	97.10 ✓
12	5.52 ✓	25	63.17 ✓
13	0.010 ✓	26	Solutions

East Los Angeles College
Department of Mathematics
Math 227
Test 3

The Two Black Jacks Game (Approximate to the nearest hundredths)

1. Las Vegas has a new gambling game called the Two Black Jacks. In order to win this game, all you need to do is select two different Black Jacks from a standard deck. If it cost's \$ 8 for a chance to win \$450.00, compute the expected value for this game.

7 Children (Approximate to the nearest Thousandths)

A couple plans on having 7-children. What is the probability the couple has:

2. No boys?
3. One boy?
4. At least one boy?
5. No more than two boys?
6. What is the expected number of boys?

Fax Machine (Approximate to the nearest Thousandths)

A machine uses 6 special components in copying a document. If probability that each component functions is 0.92 and these components function independently of one another. What is the probability that:

7. No components function?
8. One component functions?
9. Two components function?
10. Less than three components function?
11. No more than two components function?
12. What is the expected number of components that will function?

Murders in Friedman City (Approximate to the nearest Thousandths)

Friedman City experiences a mean of 4.6 murders per week (7 days). In the next week, what is the probability Friedman City will have:

13. No murders?
14. One murder?
15. Two murders?
16. At least two murders?
17. More than one murder?
18. In the next month (5-days) what is the probability Friedman City experiences more than one murder?

Kauai Temperature (Approximate to the nearest Hundredths)

The temperature in Kauai is Normally Distributed with a mean of 75.2 degrees Fahrenheit with a standard deviation of 9.4 degrees Fahrenheit. What percent of days are:

- 19. More than 70 degrees Fahrenheit?
- 20. At least 80 degrees Fahrenheit?
- 21. No more than 90 degrees Fahrenheit?
- 22. Between 70 and 90 degrees Fahrenheit?
- 23. Between 80 and 90 degrees Fahrenheit?

(Approximate to the nearest Tenths)

- 24. What temperature represents the top 1% of temperatures?
- 25. What temperature represents the bottom 10% of temperatures?

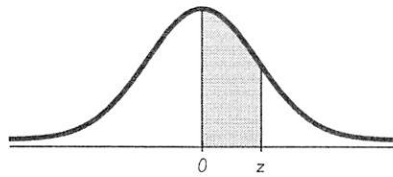


TABLE A-2 Standard Normal (z) Distribution

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	▲ .4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	▲ .4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10 and higher	.4999									

NOTE: For values of z above 3.09, use 0.4999 for the area.

*Use these common values that result from interpolation:

z score	Area
1.645	0.4500
2.575	0.4950

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Math 227 Test 3

① Expected value

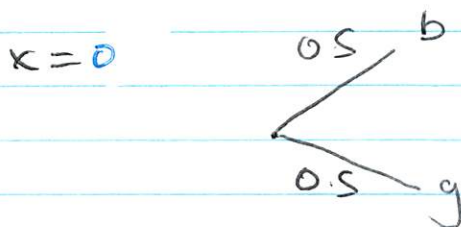
outcome x	probability $P(x)$
442 win	$\frac{2}{52} \cdot \frac{1}{51} \approx 0.0008$
-8 lose	0.9992

$$\mu = \sum_{\text{all } x} x \cdot P(x)$$

$$= 442 \cdot 0.0008 - 8 \cdot 0.9992$$

$$\boxed{\mu = -7.64}$$

② $n=7$; $x = \# \text{ of boys}$



$$P(x) = n C_x p^x (1-p)^{n-x}$$

$$P(0) = 7 C_0 \overset{!}{0} \overset{!}{0.5} \overset{!}{0.5}^{7-0}$$

$$P(0) = 0.5^7 ; \boxed{P(0) \approx 0.008}$$

$$(3) \quad x=1$$

$$p(1) = \cancel{7}^7 \cdot 0.5^1 \cdot 0.5^{\cancel{7-1}^6}$$

$$p(1) = 7 \cdot 0.5^7; \quad \boxed{p(1) \approx 0.055}$$

$$(4) \quad x \geq 1$$

$$p(x \geq 1) = 1 - p(0)$$

$$= 1 - 0.008$$

$$\approx \boxed{0.992}$$

$$(5) \quad x \leq 2$$

$$p(x \leq 2) = \overset{0.008}{p(0)} + \overset{0.055}{p(1)} + \overset{0.1641}{p(2)}$$

$$= 0.008 + 0.055 + 0.1641$$

$$\cancel{7}^{\cancel{21}^{21}} \cdot 0.5^2 \cdot 0.5^{7-2}$$

$$= 21 \cdot 0.5^7$$

$$\approx 0.1641$$

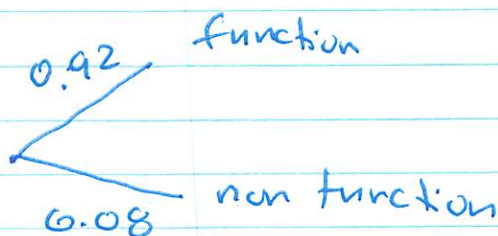
$$\approx \boxed{0.227}$$

$$(6) \mu = np ; \mu = 7 \cdot 0.5$$

$$\boxed{\mu = 3.5}$$

$$(7) n = 6 ; x = \# \text{ functioning components}$$

$$x = 0$$



$$P(x) = n C_x p^x (1-p)^{n-x}$$

$$P(0) = \cancel{6} C_0 \cancel{0.92}^0 0.08^{6-0}$$

$$P(0) = 0.8^6 ; P(0) \approx$$

$$0.0000003$$

$$(8) x = 1$$

$$P(1) = \cancel{6} C_1 \cancel{0.92}^1 0.08^5$$

$$P(1) = 6 \cdot 0.92 \cdot 0.8^5$$

$$\approx \boxed{0.00002}$$

$$(9) x = 2 ; P(2) = \cancel{6} C_2 \cancel{0.92}^{15} 0.08^4$$

$$P(2) \approx \boxed{0.0005}$$

(10) $x < 3$

$$P(x < 3) = P(0) + P(1) + P(2)$$

$$= \boxed{0.0005}$$

0.0000003 0.0005 0.00002

(11) $x \leq 2$

$$P(x \leq 2) = P(0) + P(1) + P(2)$$

$$= \boxed{0.0005} \text{ See past question}$$

(12) $\mu = np$; $\mu = 6 \cdot 0.92$

$$\boxed{\mu = 5.52}$$

(13) $\mu = 4.6$ (7 days)

$x = 0$; $P(x) = \frac{\mu^x e^{-\mu}}{x!}$

$$P(0) = \frac{4.6^0 e^{-4.6}}{0!}$$

$$P(0) = e^{-4.6}$$

$$P(0) \approx \boxed{0.010}$$

(14) $x = 1$; $P(1) = \frac{4.6^1 e^{-4.6}}{1!}$

$$= 4.6 e^{-4.6} \approx \boxed{0.046}$$

$$(15) \quad x=2 \quad , \quad p(2) = \frac{4.6^2 e^{-4.6}}{2! \cdot 2}$$

$$p(2) \approx \boxed{0.106}$$

$$(16) \quad x \geq 2 \quad ;$$

$$p(x \geq 2) = p(2) + p(3) + p(4) + \dots$$

$$= 1 - p(0) - p(1)$$

$$= 1 - 0.010 - 0.046$$

$$= \boxed{0.944}$$

$$(17) \quad x > 1 \quad , \quad p(x > 1) = p(2) + p(3) + \dots$$

$$= 1 - \overset{0.010}{p(0)} - \overset{0.046}{p(1)}$$

$$= \boxed{0.944}$$

$$(18) \quad \frac{\mu}{5} = \frac{4.6}{7} \quad ; \quad \mu = \frac{4.6 \cdot 5}{7}$$

$$\mu \approx \boxed{3.29}$$

$$p(x) = \frac{3.29^x e^{-3.29}}{x!} \quad ; \quad x > 2$$

$$P(X > 2) = P(3) + P(4) + \dots$$

$$= 1 - P(0) - P(1) - P(2)$$

$$\frac{3.29^0 e^{-3.29}}{0! \cdot 1}$$

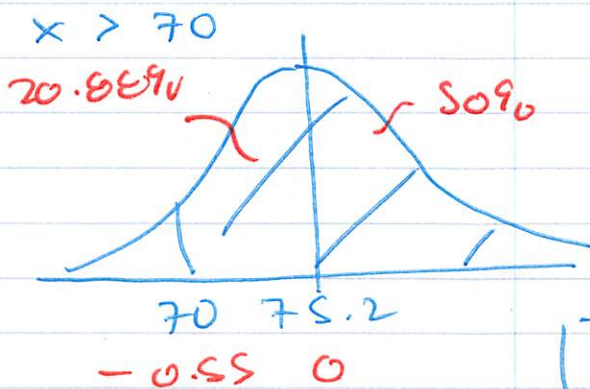
$$\frac{3.29^1 e^{-3.29}}{1! \cdot 1}$$

$$\frac{3.29^2 e^{-3.29}}{2! \cdot 2}$$

$$= 1 - e^{-3.29} - 3.29 e^{-3.29} - \frac{3.29^2 e^{-3.29}}{2}$$

$$\approx \boxed{0.639}$$

(19) $\mu = 75.2$, $\sigma = 9.4$

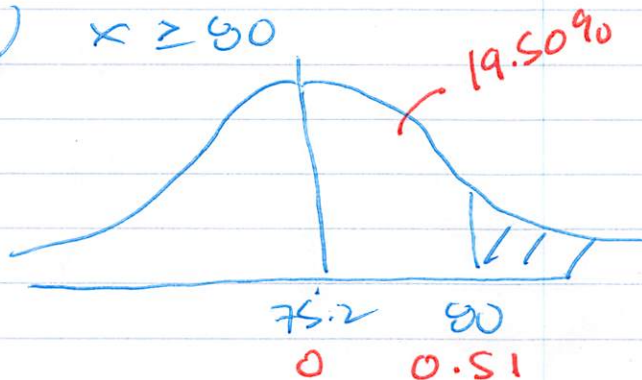


$$z = \frac{x - 75.2}{9.4}$$

$$z = -0.55$$

$$\boxed{20.889\%}$$

(20) $X \geq 80$

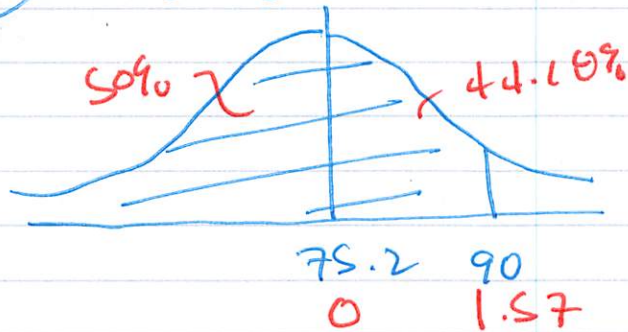


$$z = \frac{x - 75.2}{9.4}$$

$$z = 0.51$$

$$50 - 19.50 = \boxed{30.5\%}$$

(21) $x \leq 90$

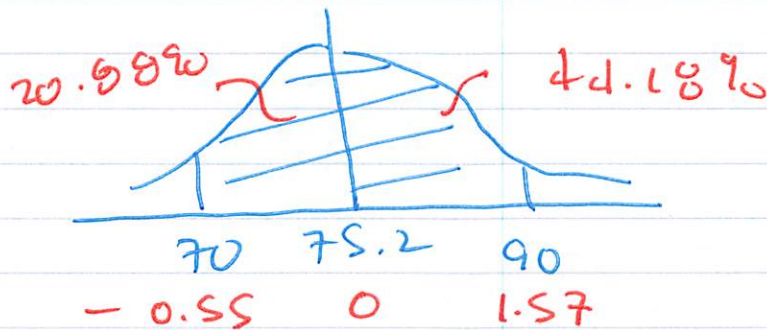


$$z = \frac{90 - 75.2}{9.4}$$

$$50 + 44.18$$

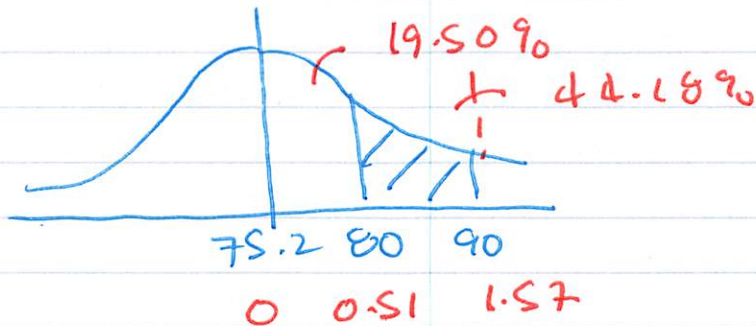
$$\boxed{94.18\%}$$

(22) Between 70 and 90



$$20.88 + 44.18 = \boxed{65.06\%}$$

(23) Between 80 and 90

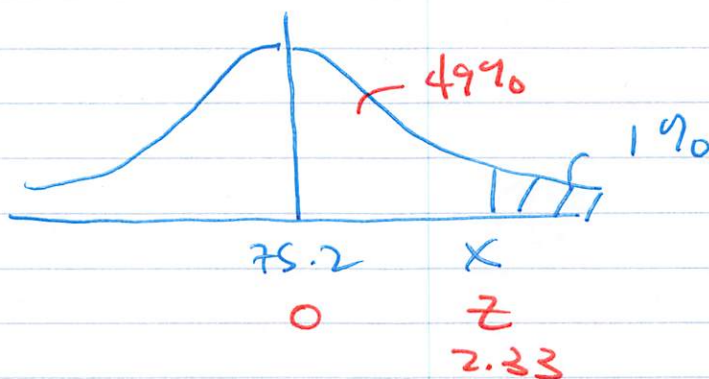


$$44.18\% - 19.50\% = \boxed{24.58\%}$$

(24) TOP 1% ; Backwards

$$x = \mu + z \cdot \sigma$$

$$x = 75.2 + 9.4 \cdot z^{2.33}$$



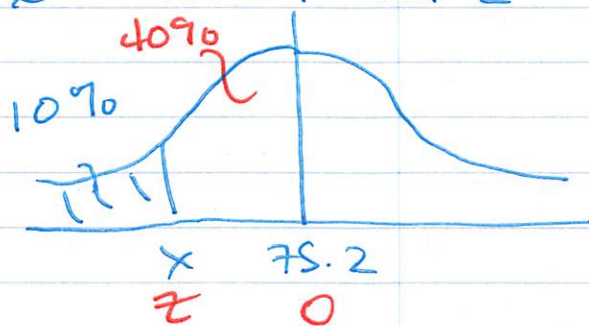
$$x = 75.2 + 9.4 \cdot 2.33$$

$$\boxed{x = 97.10}$$

(25) Bottom 10% ; Backwards

$$x = \mu + z \cdot \sigma$$

$$x = 75.2 + 9.4 \cdot z^{-1.28}$$



$$\boxed{x = 63.17}$$

$$x = 75.2 + 9.4 (-1.28)$$