Problem C.

Part 1.

population mean $= 4.5 \cdot 20 = 90 = \lambda$

$\therefore \sigma = \sqrt{90} \approx 9.4868$

$$z = \frac{x - \mu}{\sigma}$$

$z \approx .0527$

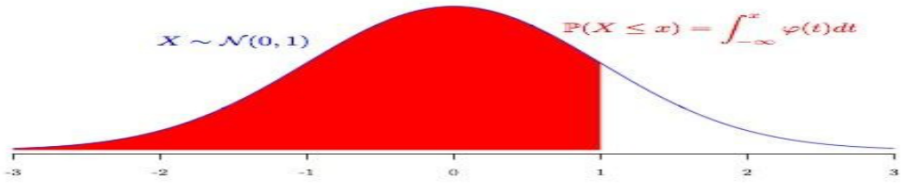
$\therefore P(z > 0.05270) = 51.99\%$

$\therefore P(\text{bug} > 90) = 1 - P(z > 0.05270) = 48.01\%$

Use R. function

ppois(90, lambda = 4.5 * 20) = 0.527995

$P = 52.80\%$



	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

Part 2.

A.

```
set.seed(20556)
rgeom(n=8, prob=0.65)
```

result:

3, 0, 1, 0, 0, 0, 0, 1

B.

$$\bar{x} = \frac{3+0+1+0+0+0+0+1}{8} = \frac{5}{8} = 0.625$$

$$s^2 = \frac{(3-0.625)^2 + \dots + (1-0.625)^2}{7} \approx 1.1272$$

$$s \approx 1.0617$$

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{s}{\sqrt{8}} = \frac{1.0617}{\sqrt{8}} \approx 0.3754$$

$100 - 94 = 6$

$\alpha = 0.06$

$\frac{\alpha}{2} = 0.03$

$\therefore z = 1.88$

$\therefore$ 94% Confidence Interval

$= 0.625 \pm 0.7058$

Part 3.

Part A.

set.seed(20560)

rexp(n=8, rate=32)

result:

0.015, 0.019, 0.087, 0.025, 0.036, 0.03, 0.013, 0.028

Part B.

1b.

$$\bar{x} = \frac{0.015+0.019+\cdots+0.028}{8} = 0.031625$$

$$s^2 = 0.0005613$$

$$\therefore s = \sqrt{0.0005613} \approx 0.02369$$

$$\alpha = 0.06$$

$$\frac{\alpha}{2} = 0.03$$

$$t = \frac{\bar{x}-\mu}{\frac{s}{\sqrt{n}}}$$

$$\approx 2.364624$$

$$SE = \frac{0.02369}{} = 0.00837567$$

∴ 94% confidence interval:

$$0.031625 \pm 0.019805$$

Part 4.

If $H_0 = 0$, has no different

$H_a \neq 0$, different

Let x: tuna

y: salmon

$$\frac{s_x^2}{n_x} + \frac{s_y^2}{n_y}$$

$$\therefore \frac{(\bar{x}-\bar{y}) - (\mu_x - \mu_y)}{\sqrt{\frac{s_x^2}{n_x} + \frac{s_y^2}{n_y}}} = \frac{1}{\sqrt{\frac{1}{15} + \frac{4}{20}}} \simeq 1.9365 = T_{orig}$$

$\because \alpha = .04$

$df = 15 + 20 - 2 = 33$

$\therefore T \simeq 2.0345$

$\because 1.9365 < 2.0345$

has no different.